

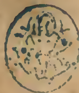
EVCLIDIS ELEMENTORVM LIBRI XV. GRAECÈ & Latiné,

Quibus, cùm ad omnem Mathematicæ scientiæ partem, tùm ad quamlibet Geometriæ tractationem, facilis comparatur aditus.

Ἐπίγραμμα παλαιόν.

Σχήματα πέντε Πλάτωνος, ἃ Πυθαγόρας σοφὸς εὗρε.
Πυθαγόρας σοφὸς εὗρε, Πλάτων δ' ἀρίδηλ' ἐδίδαξεν,
Εὐκλείδης ἐπὶ τοῖσι κλέος περικαλλὲς ἔτευξεν.




LVTETIAE,
Apud Gulielmum Cauellat, in pingui Gallina, ex aduerso collegij Cameracensis.
1558.



AD CANDIDVM LECTOREM ST. GRACILIS Præfatio.

PERMAGNI referre ſemper exiſtimaui, lector beneuole, quantum quiſque ſtudiȷ́ & diligentiæ ad percipienda ſcientiarum elemẽta adhibeat, quibus non ſatis cognitis, aut perperam intellectis, ſi vel digitum progredi tentes, erroris caliginem animis offundas, non veritatis lucem rebus obſcuris adferas. Sed principiorum quanta ſint in diſciplinis momenta, haud facilè credat, qui rerum naturam ipſa ſpecie, non viribus metiatur. Vt enim corporũ quæ oriuntur & intereunt, viliſsima tenuiſsimáque vidẽtur initia: ita rerum æternarum & admirabiliũ, quibus nobiliſsimæ artes continentur, elementa ad ſpeciem ſunt exilia, ad vires & facultatẽ quàm maxima. Quis non videt ex fici tantulo grano, vt ait Tullius, aut ex acino vinaceo, aut cæterarum frugum aut ſtirpium minutiſsimis

minibus tantos truncos ramosque proceari? Nã Mathematicorũ initia illa quidẽ dictu audituq́; perexigua, quantam theorematum syluam nobis pepererunt? Ex quo intelligi potest, vt in ipsis seminibus, sic & in artiũ principiis inesse vim earum rerum, quæ ex his progignuntur. Præclarè igitur Aristoteles, vt alia permulta, μέγιστον ἴσως ἀρχὴ παντός, καὶ ὅσῳ κράτιστον τῇ δυνάμει, τοσούτῳ μικρότατον ὂν τῷ μεγέθει χαλεπόν ἐστιν ὀφθῆναι. *Quocirca committendum non est, vt nõ bene prouisa & diligenter explorata scientiarum principia, quibus propositarum quarumq́; rerum veritas sit demonstranda, vel constituas, vel constituta approbes. Cauendũ etiã, vt ne tantulum quidem fallaci & captiosa interpretatione turpiter deceptus, à vera principiorum ratione temere deflectas. Nam qui initio fortè aberrauerit, is vt tandem in maximis versetur erroribus necesse est: cùm ex vno erroris capite densiores sensim tenebræ rebus clarissimis obducantur. Quid tam varias veterum physiologorũ sententias non modò cum rerum veritate pugnãtes, sed vehementer etiam inter se dissentientes nobis inuexit? Equidem haud scio fuerítne vlla potior tanti dissidij causa, quàm quòd ex principiis partim falsis partim non consentaneis du-*

ctas rationes probando adhiberent. Fit enim plerunque, ut qui non rectè de artium rerúmque elementis sentiunt, ad præfinitas quasdam opiniones suas omnia reuocare studeant. Pythagorei, ut meminit Aristoteles, cùm denarij numeri summam perfectionem cælo tribuerent, nec plures tamen quàm nouem sphæras cernerent, decimam affingere ausi sunt terræ aduersam, quam ἀντίχθονα appellarunt. Illi enim uniuersitatis rerúmque singularũ naturam ex numeris ceu principiis æstimantes, ea protulerunt quæ φαινομένοις congruere nusquam sunt cognita. Nam ridicula Democriti, Anaximenis, Melißi, Anaxagoræ, Anaximandri, & reliquorum id genus physiologorum somnia, ex falsis illa quidem orta naturæ principiis, sed ad Mathematicum nihil aut parum spectantia, sciens prætereo. Nonnullos attingã, qui repetitis altius, uel aliter ac decuit positis rerum initiis, cùm in physicis multa turbarunt, tùm Mathematicos oppugnatione principiorum peßimè mulctarunt. Ex planis figuris corpora constituit Timæus: Geometrarum hîc quidem principia cuniculis oppugnãtur. Nã & superficies seu extremitates craßitudinẽ habebunt, & lineæ latitudinem: denique pũcta nõ erunt indiuidua, sed linearum partes. Prædicãt

Democritus atq; Leucippus illas atomos suas, & indiuidua corpuscula. Concedit Xenocrates impartibiles quasdã magnitudines. Hîc verò Geometriæ fundamenta apertè petuntur, & funditus euertuntur: quibus dirutis nihil equidem aliud video restare, quàm vt amplissima Mathematicorum theatra repente concidant. Iacebũt ergo, si diis placet, tot præclara Geometrarum de asymmetris & alogis magnitudinibus theoremata. Quid enim causæ dicas cur indiuidua linea hanc quidem metiatur, illam verò metiri nõ queat? Siquidem quod minimum in vnoquoque genere reperitur, id communis omnium mensura esse solet. Innumerabilia profectò sunt illa, quæ ex falsis eiusmodi decretis absurda cõsequuntur: & horum permulta quidem Mathematicus, sed longè plura colligit Physicus. Quid varia ψευδογραφημάτων genera commemorẽ, quæ ex hoc vno fonte tam longè latéque diffusa fluxisse videntur? Notissimus est Antiphontis tetragonismus, qui Geometrarum & ipse principia non parum labefecit, cùm rectæ lineæ curuam posuit æqualem. Lõgum esset mihi singula percensere, præsertim ad alia properanti. Hoc ergo certum, fixum & in perpetuum ratum esse oportet, quod sapienter monet Aristoteles, σπουδαστέον ὅπως ὁ-

ϱιθῶσι καλῶς αἱ ἀρχαί. μεγάλην γὰρ ἔχουσι ῥοπὴν πρὸς ἑπόμενα. Nam principiis illa congruere debent, quæ sequuntur. Quòd si tantum perspicitur in istis exilioribus Geometriæ initiis, quæ puncto, linea, superficie definiūtur, momentum, Vt ne hæc quidem sine summo impendentis ruinæ periculo conuelli aut oppugnari poßint: quanta quæso vis putanda est huius ςοιχειώσεως, quā collatis tot præstantißimorum artificum inuentis, mira quadam ordinis solertia contexuit Euclides, vniuersæ Matheseως elementa complexu suo coercentem? Vt igitur omnibus rebus instructior & paratior quisque ad hoc studiū libētius accedat, & singula vel minutißima exactius secum reputet atque perdiscat, operæpreciū cēsui in primo institutionis aditu vestibulóque præcipua quædam capita, quibus tota ferè Mathematicæ scientiæ ratio intelligatur, breuiter explicare: tum ea quæ sunt Geometriæ propria, diligenter persequi: Euclidis denique in extruenda hac ςοιχειώσει consiliū sedulò ac fideliter exponere. Quæ ferè omnia ex Aristotelis potißimū ducta fontibus, nemini inuisa fore cōfido, qui modò ingenuū animi candorem ad legendum attulerit. Ac de Mathematicæ diuisione primū dicamus.

Mathematicæ in primis scientiæ studiosos

fuiſſe Pythagoreos, non modò hiſtoricorum, ſed etiam philoſophorum libri declarant. His ergo placuit, vt in partes quatuor vniuerſum diſtribuatur Mathematicæ ſciẽtiæ genus, quarũ duas περὶ τὸ ποσὸν, reliquas περὶ τὸ πηλίκον verſari ſtatuerunt. Nam & τὸ ποσὸν vel ſine vlla comparatione ipſum per ſe cognoſci, vel certa quadã ratione comparatum ſpectari: in illo Arithmeticam, in hoc verſari Muſicam: & τὸ πηλίκον partim quieſcere, partim moueri quidem: illud Geometriæ propoſitum eſſe: quod verò ſua ſponte motu cietur, Aſtronomiæ. Sed ne quis falsò putet Mathematicam ſcientiam, quòd in vtroque quanti genere cernitur, idcirco inanem videri (ſi quidem non ſolùm magnitudinis diuiſio, ſed etiam multitudinis accretio infinitè progredi poteſt) meminiſſe decet, τὸ πηλίκον τε καὶ τὸ ποσὸν, quæ ſubiecto Mathematicæ generi impoſita ſunt à Pythagoreis nomina, non cuiuſcũque modi quãtitatem ſignificare, ſed eam demũ, quæ tùm multitudine tùm magnitudine ſit definita, et ſuis circunſcripta terminis. Quis enim vllã infiniti ſciẽtiã defendat? Hoc ſcitũ eſt, quod non ſemel docet Ariſtoteles, infinitum ne cogitatione quidẽ complecti quenquã poſſe. Itaque ex infinita multitudinis & magnitudinis δυνάμεως, finitam hæc

ſcientia decerpit & amplectitur naturam, quã tractet, & in qua verſetur. Nã de vulgari Geometrarum conſuetudine quid ſentiendum ſit, cũ data interdum magnitudine infinita aut fabricantur aliquid, aut proprias generis ſubiecti affectiones exquirunt; diſertè monet Ariſtoteles, οὐδὲ νῦν *(de Mathematicis loquens)* δέονται τοῦ ἀπείρου, οὐδὲ χρῶνται, ἀλλὰ μόνον εἶναι ὅσην ἂν βούλωνται, πεπερασμένην: *Quamobrem diſputatio ea qua infinitum refellitur, Mathematicorum decretis rationibuſque non aduerſatur, nec eorũ apodixes labefacit. Etenim tali infinito opus illis nequaquã eſt, quod exitu nullo peragrari poſſit, nec talem ponunt infinitam magnitudinem: ſed quantamcunque velit aliquis effingere, ea vt ſuppetat, infinitam præcipiunt. Quinctiã nõ non modò immenſa magnitudine opus non habent Mathematici, ſed ne maxima quidem: cùm inſtar maximæ minima quæque in partes totidẽ pari ratione diuidi queat. Alteram Mathematicæ diuiſionem attulit Geminus, vir (quantum ex Proclo coniicere licet)* μαθημάτων *laude clariſsimus. Eam, quæ ſuperiore plenior & accurratior forte viſa eſt, cùm doctiſsimè pertractarit ſua in decimũ Euclidis præfatione P. Mõtaureus vir ſenatorius, et regiæ bibliothecæ præ-*

fectus, leuiter attingam. Nam ex duobus rerum velut summis generibus, τῶν νοητῶν καὶ τῶν αἰσθητῶν, quæ res sub intelligentiã cadunt, Arithmeticæ & Geometriæ attribuit Geminus: quæ vero in sensus incurrunt, Astrologiæ, Musicæ, Supputatirci, Opticæ, Geodæsiæ & Mechanicæ adiudicauit. Ad hanc certè diuisionem spectasse videtur Aristoteles, cùm Astrologiam, Opticam, harmonicam φυσικώτερα τῶν μαθημάτων nominat, vt quæ naturalibus & Mathematicis interiectæ sint, ac velut ex vtrisq; mixtæ disciplinæ: Siquidem genera subiecta à Physicis mutuantur, causas verò in demostrationibus ex superiore aliqua scientia repetunt. Id quod Aristoteles ipse apertißimè testatur, ἐνταῦθα γὰρ, φησί, τὸ μὲν ὅτι, τῶν αἰσθητικῶν εἰδέναι, τὸ δὲ διότι, τῶν μαθηματικῶν. Sequitur, vt quid Mathematicæ conueniat cum Physica & prima Philosophia: quid ipsa ab vtraque differat, paucis ostẽdamus. Illud quidem omnium commune est, quòd in veri contemplatione sunt positæ, ob idque θεωρητικαὶ à Græcis dicuntur. Nam cùm διάνοια siue ratio & mens omnis sit vel πρακτικὴ, vel ποιητικὴ, vel θεωρητικὴ, totidem scientiarũ sint genera necesse est. Quòd si Physica, Mathematica, & prima Philosophia, nec in agendo, nec in ef-

ficiendo sunt occupatæ, hoc certè perspicuum est, eas omnes in cognitione contemplationéque necessariò versari. Cùm enim rerum non modò agendarum, sed etiam efficiẽdarum principia in agente vel efficiente consistant, illarum quidem προαίρεσις, harum autem vel mens, vel ars, vel vis quædam & facultas: rerum profectò naturalium, Mathematicarum, atque diuinarũ principia in rebus ipsis, nõ in philosophis inclusa latent. Atque hæc vna in omnes valet ratio, quæ θεωρητικὰς esse colligat. Iam verò Mathematica separatim cum Physica congruit, quòd vtraque versatur in cognitione formarum corpori naturali inhærentium. Nam Mathematicus plana, solida, longitudines & puncta cõtemplatur, quæ omnia in corpore naturali à naturali quoque philosopho tractantur. Mathematica item & prima philosophia hoc inter se propriè conueniunt, quòd cognitionem vtraque persequitur formarũ, quoad immobiles, & à cõcretione materiæ sunt liberæ. Nã tametsi Mathematicæ formæ re vera per se non cohærent, cogitatione tamen à materia & motu separantur, οὐδὲ γίνεται ψεῦδος χωριζόντων, vt ait Aristoteles. De cognatione & societate breuiter diximus. Iã quid intersit, videamus. Vnaquæque mathematicarũ

certum quoddam rerum genus propositũ habet, in quo versetur, vt Geometria quãtitatem & continuationem aliorum in vnam partem, aliorum in duas, quorundam in tres: eorumque quatenus quanta sunt & continua, affectiones cognoscit. Prima autem philosophia, cùm sit omnium cõmunis, vniuersum Entis genus, quæque ei accidunt & conueniunt hoc ipso quòd est, considerat. Ad hæc, Mathematica eam modò naturam amplectitur, quæ quanquam non mouetur, separari tamen seiungique nisi mente & cogitatione à materia non potest, ob eamque causam ἐξ ἀφαιρέσεως dici cõsueuit. Sed Prima philosophia in iis versatur, quæ & seiũcta, & æterna, & ab omni motu per se soluta sunt ac libera. Cæterùm Physica & Mathematica quãquã subiecto discrepare non videntur, modo tamen rationéque differunt cognitionis & contemplationis, vnde dißimilitudo quoque scientiarũ sequitur. Etenim mathematicæ species nihil re vera sunt aliud, quàm corporis naturalis extremitates, quas cogitatione ab omni motu & materia separatas Mathematicus contemplatur: sed easdem consectatur physicorum ars, quatenus cum materia comprehensæ sunt, & corpora motui obnoxia circunscribunt. Ex quo fit, vt quæcun-

que in Mathematicis incommoditates accidunt, eædem etiam in naturalibus rebus videātur accidere, non autē vicißim. Multa enim in naturalibus sequuntur incōmoda, quæ nihil ad Mathematicum attinent, διὰ τὸ, *inquit Aristoteles,* τὰ μὲν ἐξ ἀφαιρέσεως λέγεται, τὰ μαθηματικὰ, τὰ δὲ φυσικὰ ἐκ προσθέσεως *Siquidem res cū materia deuinctas contemplatur physicus: Mathematicus verò rem cognoscit circunscriptis iis omnibus quæ sensu percipiuntur, vt grauitate, leuitate, duritie, mollitie, & præterea calore, frigore, aliísque contrariorum paribus quæ sub sensum subiecta sunt: tantùm autem relinquit quātitatem & continuum. Itaque Mathematicorū ars in iis quæ immobilia sunt, cernitur* (τὰ γὰρ μαθηματικὰ τῶν ὄντων ἄνευ κινήσεώς ἐστιν, ἔξω τῆς περὶ τὴν ἀστρολογίαν) *quæ verò in naturæ obscuritate posita est, res quidem quæ nec separari nec motu vacare possunt contemplatur. Id quod in vtroque scientiæ genere perspicuum esse potest, siue res subiectas definias, siue proprietates earum demonstres. Etenim numerus, linea, figura, rectum, inflexum, æquale, rotundum, vniuersa denique Mathematicus quæ tractat & profitetur, absque motu explicari docerique possunt:* χωρὶς ἃ γὰρ τῇ νοήσει κινήσεώς ἐστι: *Physicæ*

*autem sine motione species nequaquam possunt
intelligi. Quis enim, hominis, plātæ, ignis, ossiū,
carnis naturā & proprietates sine motu qui ma
teriam sequitur, perspiciat? Siquidem tantisper
substantia quæque naturalis constare dici solet,
quoad opus & munus suum, agēdo patiendóque
tueri ac sustinere valeat: qua certè amissa δυνά-
μει, ne nomen quidem nisi ὁμωνύμως retinet. Sed
Mathematico ad explicandas circuli aut trian-
guli proprietates, nullū adferre potest vsum, ma
teriæ vt auri, ligni, ferri, in qua insunt, cōsidera
tio: quin eò verius eiusmodi rerū, quarum species
tanquā materia vacantes efformemus animo, na
turam complectemur, quòd coniunctione mate-
riæ quasi adulterari deprauaríque videntur.
Quocirca Mathematicæ species eodem modo quo
κοιλὸν, siue concauitas, sine motu & subiecto
definitione explicari cognoscique possunt: natu-
rales verò cùm eam vim habeant, quā, vt ita di
cam, simitas, cum materia comprehensæ sunt,
nec absque ea separatim possunt intelligi: quibus
exemplis quid inter Physicas & Mathematicas
species intersit, haud difficile est animaduerte-
re. Illis certè non semel est vsus Aristoteles. Va-
leant ergo Protagoræ sophismata, Geometras hoc
nomine refellentis, quòd circulus normam pun-*

cto non attingat. Nam diuina Geometrarũ theoremata qui sensu æstimabit, vix quicquam reperiet quod Geometræ concedendum videatur. Quid enim ex his quæ sensum mouent, ita rectũ aut rotũdum dici potest, vt à Geometra ponitur? Nec verò absurdum est aut vitiosum, quòd lineas in puluere descriptas pro rectis aut rotundis assumit, quæ nec rectæ sunt nec rotundæ, ac ne latitudinis quidem expertes. Siquidẽ nõ iis vtitur geometra quasi inde vim habeat conclusio, sed eorum quæ discenti intelligenda relinquuntur, rudem ceu imaginem proponit. Nam qui primùm instituuntur, hi ductu quodam & velut χειραγωγίᾳ sensuum opus habẽt, vt ad illa quæ sola intelligentia percipiuntur, aditum sibi comparare queant. Sed tamen existimandum nõ est rebus Mathematicis omnino negari materiã, ac nõ eã tantùm quæ sensum afficit. Est enim materia alia quæ sub sensum cadit, alia quæ animo & ratione intelligitur. Illam αἰσθητὴν, hanc νοητὴν vocat Aristoteles. Sensu percipitur, vt æs, vt lignũ, omnisque materia quæ moueri potest. Animo & ratione cernitur ea quæ in rebus sensilibus inest, sed nõ quatenus sensu percipiũtur, quales sunt res Mathematicorum. Vnde ab Aristotele scriptum legimus ἐπὶ τῶν ἐν ἀφαιρέσει

ὄντων rectum se habere vt simum: μετὰ συνεχοῦς γὰρ: quasi velit ipsius recti, quod Mathematicorum est, suam esse materiam, nõ minus quàm simi quod ad Physicos pertinet. Nã licet res Mathematicæ sensili vacent materia, non sunt tamen indiuiduæ, sed propter cõtinuationem partitioni semper obnoxiæ, cuius ratione dici possũt sua materia non omnino carere: quin aliud videtur τὸ εἶναι γραμμῇ, aliud quoad continuationi adiũcta intelligitur linea. Illud enim ceu forma in materia, proprietatum causa est, quas sine materia percipere nõ licet. Hæc est societatis & dissidij Mathematicæ cum Physica & prima Philosophia ratio. Nunc autem de nominis etymo & notatione pauca quædam afferamus. Nam si quæ iudicio & ratione imposita sunt rebus nomina, ea certè non temere indita fuisse credendũ est, quibus scientias appellari placuit. Sed neque otiosa semper haberi debet ista etymologiæ indagatio, cùm ad rei etiam dubiæ fidem sæpe non parum valeat recta nominis interpretatio. Sic enim Aristoteles ducto ex verborum ratione argumẽto, αὐτομάτου, μεταβολῆς, αἰθέρος, aliarumque rerum naturam ex parte confirmauit. Quoniam igitur Pythagoras Mathematicam scientiam nõ modò studiosè coluit, sed etiam repetitis à capitè

principiis,

principiis, geometricam contemplationem in liberalis disciplinæ formam composuit, & perspectis absque materia, solius intelligentiæ adminiculo theωrematibus, tractationem περὶ τῶν ἀλόγων, & κοσμικῶν σχημάτων constitutionem excogitauit: credibile est, Pythagorã, aut certè Pythagoreos, qui & ipsi doctoris sui studia libenter amplexi sunt, huic sciẽtiæ id nomẽ dedisse, quòd cum suis placitis atque decretis cõgrueret, rerúmque propositarum naturam quoquo modo declararet. Ita cùm existimarẽt illi omnẽ disciplinã, quæ μάθησις dicitur, ἀνάμνησιν esse quandam, id est recordationem & repetitionẽ eius sciẽtiæ, cuius antè quàm in corpus immigraret, compos fuerit anima, quemadmodum Plato quoque in Menωne, Phædωne, & aliis aliquot locis videtur astruxisse: animaduerterent autem einsmodi recordationem, quæ non posset multis ex rebus perspici, ex his potißimum scientiis demonstrari, si quis nimirum, ait Plato, ἐπὶ τὰ διαγράμματα ἄγῃ: probabile est equidẽ Mathematicas à Pythagoreis artes κατ᾽ ἐξοχὴν fuisse nominatas, vt ex quibus μάθησις, id est æternarum in anima rationum recordatio διαφερόντως & præcipuè intelligi posset. Cuius etiam rei fidem nobis diuinus fecit Plato, qui in Menωne Socratem in-

duxit hoc argumenti genere persuadere cupientem discere nihil esse aliud quàm suarum ipsius rationum animũ recordari. Etenim Socrates pusionem quendam, vt Tullij verbis vtar, interrogat de geometrica dimẽsione quadrati: ad ea sic ille respondet vt puer, & tamen tam faciles interrogationes sunt, vt gradatim respondens, eodem perueniat, quò si geometrica didicisset. Aliam nominis huius rationem Anatolius exposuit, vt est apud Rhodiginum, quòd cùm cæteræ disciplinæ deprehendi vel non docente aliquo poßint omnes, Mathematica sub nullius cognitionem veniant, nisi præeunte aliquo, cuius solertia succidantur vepreta, vel exurantur, & superciliosa complanentur aspreta. Ita enim Cælius: quod quam vim habeat, non est huius loci curiosius perscrutari. Equidem M. Tullius Mathematicos in magna rerum obscuritate, recondita arte, multiplicique ac subtili versari scribit. sed quis nescit idipsum cũ aliis grauioribus scientiis, esse cõmune? Est enim, vel eodem autore Tullio, omnis cognitio multis obstructa difficultatibus, maximaque est & in ipsis rebus obscuritas, & in iudiciis nostris infirmitas: nec vllus est, modò interius paulò Physica penetrarit, qui nõ facilè sit expertus, quàm multi vndique

emergant, rerum naturalium causas inquirentibus, & inexplicabiles labyrinthi. Sunt qui ex demonstrationum firmitate nominari Mathematicas opinantur: cuius etiam rationis momentum alio seorsim loco expĕdendum fuerit. Quocirca primam verbi notationem, quam sequutus est Proclus, nobis retinendam censeo. Hactenus de vniuerso Mathematicæ genere quanta potui & perspicuitate & breuitate dixi. Sequitur, vt de Geometria separatim atque ordine ea disseram, quæ initio sum pollicitus. Est autem Geometria, vt definit Proclus, scientia, quæ versatur in cognitione magnitudinum, figurarum, & quibus hæ continentur, extremorum, item rationum & affectionũ, quæ in illis cernuntur ac inhærent: ipsa quidẽ progrediens à puncto indiuiduo per lineas & superficies, dum ad solida conscendat, variásque ipsorum differentias patefaciat. Quúmque omnis sciẽtia demonstratiua, vt docet Aristoteles, tribus quasi momentis contineatur, genere subiecto, cuius proprietates ipsa scientia exquirit & contẽplatur: causis & principiis, ex quibus primis demonstrationes conficiuntur: & proprietatibus, quæ de genere subiecto per se enunciantur: Geometriæ quidem subiectum in lineis, triangulis, quadrangulis, circu-

lis, planis, solidis, atque omnino figuris & magnitudinibus, earumque extremitatibus cõsistit. His autem inhærent diuisiones, rationes, tactus, æqualitates, παραβολαὶ, ὑπερβολαὶ, ἐλλείψεις, atque alia generis eiusdem propè innumerabilia. Postulata verò & Axiωmata ex quibus hæc inesse demonstrantur, eiusmodi ferè sunt: Quouis centro & interuallo circulum describere: Si ab æqualibus æqualia detrahas, quæ relinquũtur esse æqualia, cæteráque id genus permulta, quæ licet omnium sint communia, ad demonstrandum tamen tum sunt accommodata, cùm ad certum quoddam genus traducuntur. Sed cùm præcipua videatur Arithmeticæ et Geometriæ inter Mathematicas dignatio, cur Arithmetica sit ἀκριβεστέρα et exactior quàm Geometria, paucis explicandum arbitror. Hîc verò & Aristotelem sequemur ducem, qui scientiam cum scientia ita comparat, vt accuratiorem esse velit eam, quæ rei causam docet, quã quæ rem esse tantũ declarat: deinde quæ in rebus sub intelligentiam cadẽtibus versatur, quàm quæ in rebus sensum mouẽtibus cernitur. Sic enim & Arithmetica quàm Musica, & Geometria quàm Optica, & Stereometria quàm Mechanica exactior esse intelligitur. Postremò quæ ex simplicioribus initiis con-

ſtat, quàm quæ aliqua adiectione cõpoſitis vtitur. Atque hac quidem ratione Geometriæ præſtat Arithmetica, quòd illius initium ex additione dicatur, huius ſit ſimplicius. Eſt enim punctum, vt Pythagoreis placet, vnitas quæ ſitum obtinet: vnitas verò punctum eſt quod ſitu vacat. Ex quo percipitur, numerorũ quàm magnitudinum ſimplicius eſſe elementum, numeróſque magnitudinibus eſſe puriores, & à concretione materiæ magis disiunctos. Hæc quanquam nemini ſunt dubia, habet & ipſa tamen Geometria quo ſe plurimum efferat, opibuſque ſuis ac rerum vbertate multiplici vel cum Arithmetica certet: id quod tute facilè deprehendas cùm ad infinitam magnitudinis diuiſionem, quam reſpuit multitudo, animum conuerteris. Nunc quæ ſit Arithmeticæ & Geometriæ ſocietas, videamus. Nam theorematum quæ demonſtratione illuſtrãtur, quædam ſunt vtriuſque ſciẽtiæ communia, quædam verò ſingularum propria. Etenim quòd omnis proportio ſit ῥητὸς ſiue rationalis, Arithmeticæ ſoli conuenit, nequaquam Geometriæ, in qua ſunt etiam ἄῤῥητοι, ſeu irrationales proportiones: item, quadratorum gnomonas minimo definitos eſſe, Arithmeticæ proprium (ſi quidem in Geometria nihil tale minimum eſſe poteſt)

ſed ad Geometriam propriè ſpectăt ſitus, qui in numeris locum non habent: tactus, qui quidem à continuis admittuntur: ἄλογον, quoniam vbi diuiſio infinitè procedit, ibi etiam τὸ ἄλογον eſſe ſolet. Communia porrò vtriuſque ſunt illa, quæ ex ſectionibus eueniunt, quas Euclides libro ſecūdo eſt perſequutus: niſi quòd ſectio per extremā & mediam rationem in numeris nuſquam reperiri poteſt. Iam verò ex theωrematibus eiuſmodi communibus, alia quidem ex Geometria ad Arithmeticam traducuntur: alia contrà ex Arithmetica in Geometriam transferuntur: quædam verò perinde vtrique ſcientiæ conueniunt, vt quæ ex vniuerſa arte Mathematica in vtrāque harum conueniant. Nam & alterna ratio, & rationum conuerſiones, compoſitiones, diuiſiones hoc modo communia ſunt vtriuſque. Quæ autem ſunt περὶ συμμέτρων, id eſt de commenſurabilib⁹, Arithmetica quidē primū cognoſcit et contēplatur: ſecūdo loco Geometria Arithmeticā imitata. Quare & cōmenſurabiles magnitudines illæ dicuntur, quæ rationē inter ſe habent quā numerus ad numerū, perinde quaſi cōmenſuratio & συμμετρία in numeris primùm cōſiſtat (Vbi enim numerus, ibi & σύμμετρον cernitur: & vbi σύμμετρον, illic etiam numerus) ſed quæ

triangulorum sunt & quadrangulorum, à Geometra primùm considerantur: tùm analogia quadam Arithmeticus eadem illa in numeris cõtẽplatur. De Geometriæ diuisione hoc adiiciendum puto, quòd Geometriæ pars altera in planis figuris cernitur, quæ solam latitudinem longitudini coniunctam habent: altera verò solidas contemplatur, quæ ad duplex illud interuallũ crassitudinem adsciscũt. Illam generali Geometriæ nomine veteres appellarunt: hanc propriè Stereometriam dixerunt. Ita Geometriam cum Optica, & Stereometriam cum Mechanica non raro cõparat Aristoteles. Sed illius cognitio huius inuentionem multis seculis antecessit, si modò Stereometriam nc Socratis quidem ætate vllam fuisse omnino verum est, quemadmodum à Platone scriptum videtur. Ad Geometriæ vtilitatẽ accedo, quæ quanquam suapte vi & dignitate ipsa per se nititur, nullius vsus aut actionis ministerio mãcipata (vt de Mathematicis omnibus sciẽtiis concedit in Politico Socrates) si quid ex ea tamen vtilitatis externæ quæritur, Dij boni quàm lætos, quàm vberes, quàm varios fructus fundit? Nec verò audiendus est vel Aristippus, vel Sophistarũ alius, qui Mathematicorũ artes idcirco repudiet, quòd ex fine nihil docere videãtur, eiúsque quod melius aut deterius nullam habeãt

rationem. Vt enim nihil causæ dicas, cur sit melius, trianguli, verbi gratia, tres angulos duobus esse rectis æquales: minimè tamen fuerit consentaneum, Geometriæ cognitionem vt inutilẽ exagitare, criminari, explodere, quasi quæ finẽ & bonũ quò referatur, habeat nullũ. Multas haud dubiè solius contemplationis beneficio citra materiæ contagionem adfert Geometria cõmoditates partim proprias, partim cum vniuerso genere communes. Cùm enim Geometria, vt scripsit Plato, eius quod semper est cognitionem profiteatur, ad veritatem excitabit illa quidem animũ, & ad ritè philosophandum cuiusque mentem comparabit. Quinetiam ad disciplinas omnes facilius perdiscendas, attigeris nécne Geometriam, quanti referre censes? Nam vbi cum materia cõiungitur, nónne præstantissimas procreat artes, Geodæsiã, Mechanicam, Opticã, quarũ omnium vsu, mortaliũ vitam summis beneficiis complectitur? Etenim bellica instrumenta, vrbiúmque propugnacula, quibus munitæ vrbes, hostium vim propulsarẽt, hiis adiutricibus fabricata est: montium ambitus & altitudines, locorũq; situs nobis indicauit: dimetiendorum & mari & terra itinerum rationẽ præscripsit: trútinas & statéras, quibus exacta numerorum æqualitas in ciuitate retineatur, cõposuit: vniuersi ordinem si-

mulachris expreßit: multáque quæ hominum fidem superaret, omnibus persuasit. Vbique extāt præclara in eā rem testimonia. Illud memorabile, quod Archimedi rex Hiero tribuit. Nā extructo vastæ molis nauigio, quod Hiero AEgyptiorum regi Ptolemæo mitteret, cùm vniuersa Syracusanorum multitudo collectis simul viribus nauem trahere nō posset, effecissétque Archimedes vt solus Hiero illā subduceret, admiratus viri scientiam rex, ἀπὸ ταύτης, ἔφη, τῆς ἡμέρας, περὶ παντὸς Ἀρχιμήδει λέγοντι πιστευτέον. *Quid? quòd Archimedes idem, vt est apud Plutarchū, Hieroni scripsit datis viribus datum pondus moueri posse? fretusque demonstrationis robore, illud sæpe iactarit, si terram haberet alteram vbi pedē figeret, ad eam, nostrā hanc se transmouere posse? Quid varia* αὐτομάτων *machinarúmque genera, ad vsus necessarios comparata memorem? Innumerabilia profectò sunt illa, et admiratione dignißima, quibus prisci homines incredibili quodam ad philosophandum studio cōcitati, inopem mortalium vitā artis huius præsidio subleuarunt: tametsi memoriæ sit proditum, Platonem Eudoxo & Archytæ vitio vertiße, quòd Geometrica problemata ad sensilia & organica abducerent. Sic enim corrumpi ab illis & labefieri Geometriæ præstantiam, quæ ab intelligi-*

bilibus & incorporeis rebus ad ſenſiles & corporeas prolaberetur. Quaproter ridicula idē ſcripſit Plato Geometrarū eſſe vocabula, quæ quaſi ad opus & actionem ſpectent, ita ſonare videntur. Quid enim eſt quadrare, ſi nō opus facere? Quid addere, producere, applicare? Multa quidē ſunt eiuſmodi nomina, quibus neceſſariò & tanquā coacti geometræ vtuntur, quippe cùm alia deſint in hoc genere cōmodiora. Sic ergo cenſuit Plato, ſic Ariſtoteles, ſic deniq; philoſophi omnes, Geometriam ipſam cognitionis gratia exercendam, nec ex aliquo vſu externo, ſed ex rerum νοητῶν intelligētia æſtimandā eſſe. Expoſita breui⁹ quā res tāta dici poßit, vtilitatis ratione, Geometriæ ortum, qui in hac rerum periodo ex hiſtoricorum monimentis nobis eſt cognitus, deinceps aperiamus. Geometria apud AEgyptios inuēta, (ne ab Adamo, Setho, Noah, quos cognitione rerū multiplici valuiſſe conſtat, eam repetamus) ex terrarum dimenſione, vt verbi præ ſe fert ratio, ortum habuiſſe dicitur: cùm anniuerſaria Nili inundatione & incremētis limo obducti agrorum termini confunderētur. Geometriam enim, ſicut & reliquas diſciplinas, in vſu quā in arte prius fuiſſe aiunt. Quòd ſanè mirum videri non debet, vt & huius & aliarum ſcientiarum inuentio ab vſu cœperit ac neceßitate. Etenim tempus,

rerum vsus, ipsa necessitas ingenium excitat, & ignauiam acuit. Deinde quicquid ortum habuit (vt tradunt Physici) ab inchoato & imperfecto processit ad perfectū. Sic artium & scientiarum principia experientiæ beneficio collecta sunt: experientia verò à memoria fluxit, quæ & ipsa à sensu primùm manauit. Nam quod scribit Aristoteles, Mathematicas artes, comparatis rebus omnibus ad vitam necessariis, in AEgypto fuisse cōstitutas, quòd ibi sacerdotes omnium concessu in otio degerent: non negat ille adductos necessitate homines ad excogitandam, verbi gratia, terræ dimetiendæ rationem, quæ theωrematū deinde inuestigationi causam dederit: sed hoc confirmat, præclara eiusmodi theωrematûm inuenta, quibus extructa Geometriæ disciplina cōstat, ad vsus vitæ necessarios ab illis non esse expetita. Itaque vetus ipsum Geometriæ nomen ab illa terræ partiundæ finiumque regundorum ratione postea recessit, & in certa quadā affectionum magnitudini per se inhærentium scientia propriè remansit. Quēadmodū igitur in merciū & contractuum gratiā, supputandi ratio, quam secuta est accurata numerorum cognitio, à Phœnicibus initium duxit: ita etiam apud AEgyptios, ex ea quam cōmemoraui causa ortum habuit Geometria. Hanc certè, vt id obiter dicam,

Thales in Græciã ex Aegypto primùm transtu lit: cui non paucæ deinceps à Pythagora, Hippo crate Chio, Platone, Archyta Tarẽtino, aliisque compluribus, ad Euclidis tempora factæ sunt re rum magnarum accessiones. Cæterùm de Eucli dis ætate id solùm addam, quod à Proclo memo riæ mandatum accepimus. Is enim commemora tis aliquot Platonis tùm æqualibus tùm discipu lis, subiicit, nõ multò ætate posteriorem illis fuisse Euclidem eum, qui Elemẽta conscripsit, & mul ta ab Eudoxo collecta, in ordinem luculentùm cõ posuit, multáque à Theæteto inchoata perfecit, quæque mollius ab aliis demonstrata fuerant, ad firmissimas & certissimas apodixes reuocauit. Vixit autem, inquit ille, sub primo Ptolemæo. Etenim ferũt Euclidẽ à Ptolemæo quõdã interro gatum, nunqua esset via ad Geometriam magis cõpendaria, quàm sit ista στοιχείωσις, respõdisse, μὴ εἶναι βασιλικὴν ἀτραπὸν ἐπὶ γεωμετρίαν. Dein de subiungit, Euclidẽ natu quidẽ esse minorẽ Pla tone, maiorem verò Eratosthene & Archimede (hi enim æquales erãt) cùm Archimedes Eucli dis mentionẽ faciat. Quòd si quis egregiã Eucli dis laudẽ, quã cùm ex aliis scriptionibus accura tissimis, tùm ex hac Geometrica στοιχειώσεως conse quutus est, in qua diuinus rerũ ordo sapientissi mis quibusq; hominibus magnæ semper admira

tioni fuit, is Proclum studiosè legat, quò rei veritatẽ illustriorẽ reddat grauissimi testis autoritas. Superest igitur vt finẽ videamus, quò Euclidis elementa referri, & cuius causa in id studiũ incumbere oporteat. Et quidẽ si res quæ tractatur, consyderes: in tota hac tractatione nihil aliud quæri dixeris, quàm vt κοσμικὰ *quæ vocantur,* σχήματα *(fuit enim Euclides professione & instituto Platonicus) Cubus, Icosaëdrũ, Octaëdrũ, Pyramis & Dodecaëdrum certa quadã suorum & inter se laterũ, & ad sphæræ diametrũ ratione eidẽ sphæræ inscripta cõprehẽdãtur. Huc enim pertinet Epigrãmation illud vetus, quod in Geometrica Michaëlis Pselli* συνόψει *scriptum legitur.*

Σχήματα πέντε Πλάτωνος, ἃ Πυθαγόρας σοφὸς εὗρε,
Πυθαγόρας σοφὸς εὗρε, Πλάτων δ' ἀρίδηλ' ἐδίδαξεν,
Εὐκλείδης ἐπὶ τοῖσι κλέος περικαλλὲς ἔτευξεν.

Quòd si discentis institutionem spectes, illud certè fuerit propositum, vt huiusmodi elementorum cognitione informatus discentis animus, ad quamlibet non modò Geometriæ, sed & aliarũ Mathematicæ partium tractationẽ idoneus paratúsque accedat. Nam tametsi institutionem hanc solus sibi Geometra vendicare videtur, & tanquam in possessionem suam venerit, alios ex-

cludere posse: inde tamen permulta suo quodãmodo iure decerpit Arithmeticus, pleraque Musicus, non pauca detrahit Astrologus, Opticus, Logisticus, Mechanicus, itemque cæteri: nec vllus est denique artifex præclarus, qui in huius se possessionis societatem cupidè non offerat, partemque sibi concedi postulet. Hinc στοιχείωσις *absolutum operi nomen, &* στοιχειωτὴς *dictus Euclides. Sed quid lõgius prouehor? Nam quod ad hãc rem attinet, tam copiosè & eruditè scripsit (vt alia complura) eo ipso, quem dixi, loco P. Mõtaureus, vt nihil desiderio loci reliquerit. Quæ verò ad dicendum nobis erant proposita, hactenus pro ingenij nostri tenuitate omnia mihi perfecisse videor. Nam tametsi & hæc eadẽ & alia pleraque multo fortè præclariora ab hominibus doctissimis, qui tùm acumine ingenij, tùm admirabili quodam lepôre dicendi semper floruerunt, grauiùs, splẽdidiùs, vberiùs tractari posse scio: tamẽ experiri libuit num quid etiam nobis diuino sit cõcessum munere, quod rudes in hac philosophiæ parte discipulos adiuuare aut certè excitare queat. Huc accessit quòd ista recẽs elemẽtorũ editio, in qua mihil nõ parum fuisset studij, aliquid à nobis efflagitare videbatur, quod eius cõmẽdationẽ adaugeret. Cũ enim vir doctissimus Io. Magnienus Mathematicarũ artium in hac Parrhi-*

siorũ Academia professor verè regius, nostrum hunc typographum in excudẽdis Mathematicorum libris diligentißimũ, ad hanc Elemẽtorum editionem sæpè & multum esset adhortatus, eiusque impulsu permulta sibi iam cõparasset typographus ad hanc rẽ necessaria, citò interuênit, malùm, Ioannis Magnieni mors insperata, quæ tã graue inflixit Academiæ vulnus, cui ne post multos quidẽ annorum circuitus cicatrix obduci vlla posse videatur. Quãobrem amisso instituti huius operis duce, typographus, qui nec sumptus antea factos sibi perire, nec studiosos, quibus id muneris erat pollicitus, sua spe cadere vellet, ad me venit, & impensè rogauit vt meã propositæ editioni operã & studium nauarẽ. quod cùm denegaret occupatio nostra, iuberet officij ratio: feci equidẽ rogatus, vt quæ subobscurè vel parum cõmodè in sermonem latinũ è græco translata videbãtur, clariore, aptiore & fideliore interpretatione nostra (quod cuiusque pace dictũ volo) lucem acciperent. Id quod in omnibus ferè libris posterioribus tute primo obtutu perspicias. Nam in sex prioribus non tantum tẽporis quantum in cæteris ponere nobis licuit: decimi autẽ interpretatio, qua melior nulla potuit adferri, P. Mõtaureo solida debetur. Atq; vt ad perspicuitatem facilitatémque nihil tibi deesse queraris, adscriptæ

ſunt propoſitionibus ſingulis vel lineares figuræ, vel punctorũ tanquam vnitatum notulæ, quæ Theonis apodixin illuſtrẽt: illæ quidẽ magnitudinum, hæ autem numerorum indices, ſubſcriptis etiam ciphrarum, vt vocãt, characteribus, qui propoſitum quemuis numerũ exprimant: ob eámque cauſam eiuſmodi vnitatum notulæ, quæ pro numeri amplitudine maius paginæ ſpatium occuparent, pauciores ſæpius depictæ ſunt, aut in lineas etiam commutatæ. Nam literarum, vt a, b, c, characteres non modò numeris & numerorum partibus nominandis ſunt accommodati, ſed etiam generales eſſe numerorum vt magnitudinum affectiones teſtantur. Adiecta ſunt inſuper quibuſdam locis non pœnitẽda Theonis ſcholia, ſiue mauis lemmata, quæ quidem longè plura acceſsiſſent, ſi plus otij & temporis vacui nobis fuiſſet relictum, quod huic ſtudio impartiremus. Hanc igitur operam boni conſule, & quæ obuia erunt impreſsionis vitia, candidus emẽda. Vale. Lutetiæ 4. Idus April. 1557.



ΕΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙΩΝ ΠΡΩΤΟΝ.

EVCLIDIS ELEMEN-
TVM PRIMVM.

ὅΡΟΙ.

α

Σημεῖόν ἐστιν, οὗ μέρος οὐθέν.

DEFINITIONES.

1

Punctum est, cuius pars nulla est.

β

γραμμὴ δὲ, μῆκος ἀπλατές.

2

Linea verò, longitudo latitudinis expers.

γ

Γραμμῆς δὲ πέρατα, σημεῖα.

3

Lineæ autem termini, ſunt puncta.

δ

Εὐθεῖα γραμμή ἐστιν, ἥτις ἐξ ἴσου τοῖς ἐφ᾽ ἑαυτῆς σημείοις κεῖται.

4

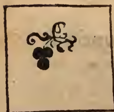
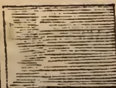
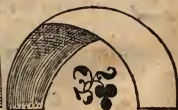
Recta linea, eſt quæ ex æquo ſua interiacet puncta.

ε

Ἐπιφάνεια δέ ἐστιν, ὃ μῆκος καὶ πλάτος μόνον ἔχει.

5

Superficies eſt quæ longitudinem latitudinémque tantùm habet.

ϛ

Ἐπιφανείας δὲ πέρατα, γραμμαί.

6

Superficiei extrema, ſunt lineæ.

ζ

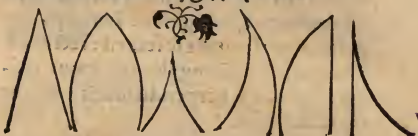
Ἐπίπεδος ἐπιφάνειά ἐστιν ἥτις ἐξ ἴσου ταῖς ἐφ᾽ ἑαυτῆς εὐθείαις κεῖται.

7

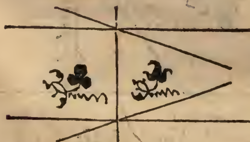
Plana superficies, est quæ ex æquo suas interiacet lineas.

Η

Ἐπίπεδος δὲ γωνία ἐστίν, ἡ ἐν ἐπιπέδῳ, δύο γραμμῶν ἁπτομένων ἀλλήλων, καὶ μὴ ἐπ' εὐθείας κειμένων, πρὸς ἀλλήλας τῶν γραμμῶν κλίσις.



8



Planus angulus est duarum linearum in plano se mutuò tãgentium, & nõ in directum iacetium, alterius ad alteram inclinatio.

θ

Ὅταν δὲ αἱ περιέχουσαι τὴν γωνίαν γραμμαὶ, εὐθεῖαι ὦσιν, εὐθύγραμμος καλεῖται ἡ γωνία.

9

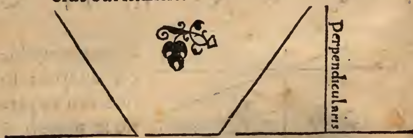
Cùm autem quæ angulum continent lineæ, rectæ fuerint, rectilineus ille angulus appellatur.

ι

Ὅταν δὲ εὐθεῖα ἐπ' εὐθεῖαν σταθεῖσα, τὰς ἐφεξῆς γωνίας ἴσας ἀλλήλαις ποιῇ, ὀρθὴ ἐστὶν ἑκατέρα τῶν ἴσων γωνιῶν: Καὶ ἡ ἐφεστηκυῖα εὐθεῖα κάθετος καλεῖται ἐφ' ἣν ἐφέστηκεν.

10

Cùm verò recta linea ſuper rectam conſiſtens lineam, eos qui ſunt deinceps angulos æquales inter ſe fecerit: rectus eſt vterque æqualiũ angulorum: & quæ inſiſtit recta linea, perpendicularis vocatur eius cui inſiſtit.



ια

Ἀμβλεῖα γωνία ἐστὶν, ἡ μείζων ὀρθῆς.

11

Obtuſus angulus eſt, qui recto maior eſt.

ιβ

Ὀξεῖα δὲ ἡ ἐλάσσων ὀρθῆς.

12

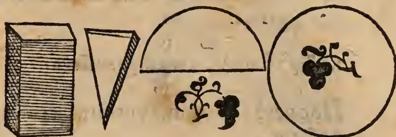
Acutus verò, qui minor eſt recto.

ιγ

Ὅρος ἐστὶν, ὅ τινός ἐστι πέρας.

13

Terminus eſt, quod alicuius extremum eſt.



ιδ

Σχῆμά ἐστι, τὸ ὑπό τινος, ἤ τινων ὅρων περιεχόμενον.

14

Figura eſt, quæ ſub aliquo, vel aliquibus terminis comprehenditur.

ιε

Κύκλος ἐστὶ σχῆμα ἐπίπεδον, ὑπὸ μιᾶς γραμμῆς περιεχόμενον, ἣ καλεῖται περιφέρεια, πρὸς ἥν, ἀφ' ἑνὸς σημείου τῶν ἐντὸς τοῦ σχήματος κειμένων, πᾶσαι αἱ προσπίπτουσαι εὐθεῖαι, ἴσαι ἀλλήλαις εἰσί.

15

Circulus, eſt figura plana ſub vna linea comprehẽſa, quę pe-



ripheria appellatur: ad quam ab vno pũcto eorum, quæ intra figuram ſunt poſita, cadentes omnes rectæ lineæ inter ſe ſunt ęquales.

ιε

Κέντρον δὲ τοῦ κύκλου, τὸ σημεῖον καλεῖται.

16

Hoc verò punctum, centrum circuli appellatur.

ιζ

Διάμετρος δὲ τοῦ κύκλου ἐστὶν, εὐθεῖα τις διὰ τοῦ κέντρου ἠγμένη, καὶ περατουμένη ἐφ' ἑκάτερα τὰ μέρη ὑπὸ τῆς τοῦ κύκλου περιφερείας, ἥτις καὶ δίχα τέμνει τὸν κύκλον.

17

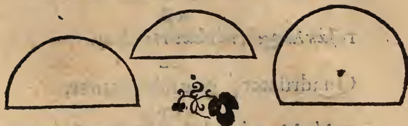
Diameter autem circuli, eſt recta quædam linea per centrum ducta, & ex vtraque parte in circuli peripheriam terminata, quæ circulum bifariam ſecat.

ιη

Ἡμικύκλιον δὲ ἐστὶ, τὸ περιεχόμενον σχῆμα ὑπό τε τῆς διαμέτρου, καὶ τῆς ἀπολαμβανομένης ἀπὸ τῆς τοῦ κύκλου περιφερείας.

18

Semicirculus eſt figura, quæ continetur ſub diametro, & ſub ea linea, quæ de circuli peripheria aufertur.



ιθ

τμῆμα κύκλου ἐστὶ σχῆμα περιεχόμενον ὑπό τε εὐθείας, καὶ κύκλου περιφερείας.

19

Segmētum circuli, eſt figura, quæ ſub recta linea & circuli peripheria cōtinetur.

κ

εὐθύγραμμα σχήματά ἐστι, τὰ ὑπὸ εὐθειῶν περιεχόμενα.

20

Rectilineæ figuræ, ſunt quæ ſub rectis lineis continentur.



κα

τρίπλευρα μὲν, τὰ ὑπὸ τριῶν.

21

Trilateræ quidem, quę ſub tribus.

κβ

τετράπλευρα δὲ, τὰ ὑπὸ τεσσάρων.

22

Quadrilaterę, quæ ſub quatuor.

κγ

πολύπλευρα δὲ, τὰ ὑπὸ πλειόνων ἢ τεσσάρων εὐθειῶν περιεχόμενα.

23

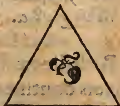
Multilaterę verò, quę ſub pluribus quàm quatuor rectis lineis comprehenduntur.

κδ

Τῶν δὲ τριπλεύρων σχημάτων, ἰσόπλευρον μὲν τρίγωνόν ἐστι, τὸ τὰς τρεῖς ἴσας ἔχον πλευράς.

24

Tri laterarum porrò figurarum, æquilaterum eſt triangulum, quod tria latera habet ęqualia.

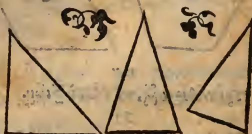


κε

Ἰσοσκελὲς δὲ, τὸ τὰς δύο μόνας ἴσας ἔχον πλευράς.

25

Iſoſceles autem, eſt quod duo tantùm ęqualia habet latera.

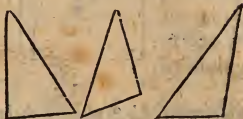


κς

Σκαληνὸν δὲ, τὸ τὰς τρεῖς ἀνίσους ἔχον πλευράς.

26

Scalenū verò, est quod tria inæqualia habet latera.



κζ

Ἔτι τε τῶν τριπλεύρων σχημάτων, ὀρθογώνιον μὲν τρίγωνόν ἐστι, τὸ ἔχον ὀρθὴν γωνίαν.

27

Ad hęc etiam, trilaterarū figurarū, rectā gulum quidē triangulū est, quod rectū angulum habet.

κη

Ἀμβλυγώνιον δὲ, τὸ ἔχον ἀμβλεῖαν γωνίαν.

28

Amblygonium autem, quod obtusum angulum habet.

κθ

Ὀξυγώνιον δὲ, τὸ τρεῖς ὀξείας ἔχον γωνίας.

29

Oxygonium verò, quod tres habet acutos angulos.

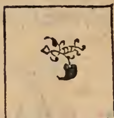
λ

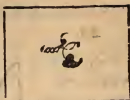
Τῶν δὲ τετραπλεύρων σχημάτων, τετράγωνον μέν ἐστιν, ὃ ἰσόπλευρόν τέ ἐστι, καὶ ὀρθογώνιον.

30

Quadrilaterarum autem figurarū, qua-

dratū quidem eſt, quod & ęquilaterū & rectangulum eſt.





λα

Ἑτερόμηκες δὲ, ὃ ὀρθογώνιον μὲν, οὐκ ἰσόπλευρον δέ.

31

Altera parte lōgior figura eſt, quę rectāgula quidem, at æquilatera non eſt.

λβ

Ῥόμβος δὲ, ὃ ἰσόπλευρον μὲν, οὐκ ὀρθογώνιον δέ.

32

Rhombus autē, quę æquilatera, ſed rectangula non eſt,





λγ

Ῥομβοειδὲς δὲ, τὸ τὰς ἀπεναντίον πλευράς τε καὶ γωνίας ἴσας ἀλλήλαις ἔχον, ὃ οὔτε ἰσόπλευρόν ἐστιν, οὔτε ὀρθογώνιον.

33

Rhomboides verò, quę aduerſa & latera & angulos habens inter ſe ęquales, ne-

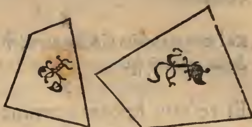
que ęquilatera eſt, neque rectangula.

λδ

τὰ δὲ παρὰ ταῦτα τετράπλευρα, τραπέζια καλείσθω.

34

Pręter has autem, reliquę quadrilaterę figurę, trapezia appellentur.



λε

Παράλληλοί εἰσιν εὐθεῖαι, αἵτινες ἐν τῷ αὐτῷ ἐπιπέδῳ οὖσαι, καὶ ἐκβαλλόμεναι εἰς ἄπειρον, ἐφ' ἑκάτερα τὰ μέρη, ἐπὶ μηδέτερα συμπίπτουσιν ἀλλήλαις.

35

Parallelę, rectæ lineę ſunt quę, cùm in eodem ſint plano, & ex vtraque parte in infinitum producantur, in neutram ſibi mutuò incidunt.

Αἰτήματα.

α

Ἠιτήσθω, ἀπὸ παντὸς σημείου ἐπὶ πᾶν σημεῖον εὐθεῖαν γραμμὴν ἀγαγεῖν.

Poſtulata.

1

Poſtuletur, vt à quouis puncto in quoduis punctum, rectam lineam ducere concedatur.

β

Καὶ πεπερασμένην εὐθεῖαν, κατὰ τὸ συνεχὲς ἐπ' εὐθείας ἐκβάλλειν.

2

Et rectam lineam terminatam in continuum rectà producere.

γ

καὶ παντὶ κέντρῳ, καὶ διαστήματι κύκλον γράφεσθαι.

3

Item quouis cẽtro & interuallo circulum deſcribere.



Κοιναὶ ἔννοιαι.

α

Τὰ τῷ αὐτῷ ἴσα, καὶ ἀλλήλοις ἐστὶν ἴσα.

Communes notiones.

1

Quæ eidem æqualia, & inter ſe ſunt æqualia.

β

Καὶ ἐὰν ἴσοις ἴσα προστεθῇ, τὰ ὅλα ἐστὶν ἴσα.

2

Et si æqualibus æqualia adiecta sint, tota sunt æqualia.

γ

Καὶ ἐὰν ἀπὸ ἴσων ἴσα ἀφαιρεθῇ, τὰ καταλειπόμενά ἐστιν ἴσα.

3

Et si ab æqualibus æqualia ablata sint, quæ relinquuntur sunt æqualia.

δ

καὶ ἐὰν ἀνίσοις ἴσα προστεθῇ, τὰ ὅλα ἐστὶν ἄνισα.

4

Et si inęqualibus æqualia adiecta sint, tota sunt inæqualia.

ε

καὶ ἐὰν ἀπὸ ἀνίσων ἴσα ἀφαιρεθῇ, τὰ λοιπὰ ἐστὶν ἄνισα.

5

Et si ab inæqualibus æqualia ablata sint, reliqua sunt inæqualia.

ς

Καὶ τὰ τοῦ αὐτοῦ διπλάσια, ἴσα ἀλλήλοις ἐστί.

6

Quę eiusdem duplicia sunt, inter se sunt æqualia.

ζ

Καὶ τὰ τοῦ αὐτοῦ ἡμίση, ἴσα ἀλλήλοις ἐστί.

7

Et quæ eiusdem sunt dimidia, inter se æqualia sunt.

η

Καὶ τὰ ἐφαρμόζοντα ἐπ' ἄλληλα, ἴσα ἀλλήλοις ἐστί.

8

Et quæ sibi mutuò congruunt, ea inter se sunt æqualia.

θ

Καὶ τὸ ὅλον τοῦ μέρους μεῖζόν ἐστι.

9

Totum est sua parte maius.

ι

Καὶ πᾶσαι αἱ ὀρθαὶ γωνίαι ἴσαι ἀλλήλαις εἰσί.

10

Item, omnes recti anguli sunt inter se æquales.

ια

Καὶ ἐὰν εἰς δύο εὐθείας εὐθεῖα ἐμπίπτουσα, τὰς ἐντὸς καὶ ἐπὶ τὰ αὐτὰ μέρη γωνίας, δύο ὀρθῶν ἐλάσσονας ποιῇ, ἐκβαλλόμεναι αἱ δύο αὗται εὐθεῖαι ἐπ' ἄπειρον, συμπεσοῦνται ἀλλήλαις ἐφ' ἃ μέρη εἰσὶν αἱ τῶν δύο ὀρθῶν ἐλάσσονες γωνίαι.

11

Et si in duas rectas lineas altera recta incidēs, inter nos ad easdémque partes an

gulos duobus rectis minores faciat, duæ illę rectæ lineæ in infinitum productæ sibi mutuò incident ad eas partes, vbi ſunt anguli duobus rectis minores.

ιβ

καὶ δύο εὐθεῖαι, χωρίον οὐ περιέχουσιν.

12

Duæ rectæ lineæ ſpatium non comprehendunt.

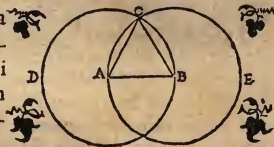
Προτάσεις.

α

Ἐπὶ τῆς δοθείσης εὐθείας πεπερασμένης, τρίγωνον ἰσόπλευρον συστήσασθαι.

Problema 1. Propoſitio 1.

Super data recta linea terminata, triangulum æquilaterum conſtituere.



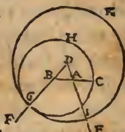
β

Πρὸς τῷ δοθέντι σημείῳ, τῇ δοθείσῃ εὐθείᾳ ἴσην εὐθεῖαν θέσθαι.

Problema 2. Propoſitio 2.

Ad datum punctum, datæ rectæ li-

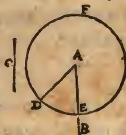
neæ æqualem rectam lineam ponere.



γ

Δύο δοθεισῶν εὐθειῶν ἀνίσων ἀπὸ τῆς μείζονος τῇ ἐλάσσονι ἴσην εὐθεῖαν ἀφελεῖν.

Problema 3. Propositio 3.



Duabus datis rectis lineis inæqualibus, de maiore ęqualem minori rectam lineam detrahere.

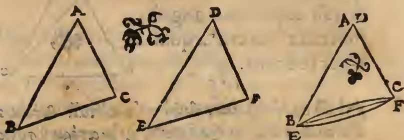
δ

Ἐὰν δύο τρίγωνα τὰς δύο πλευρὰς ταῖς δυσὶ πλευραῖς ἴσας ἔχῃ, ἑκατέραν ἑκατέρᾳ, καὶ τὴν γωνίαν τῇ γωνίᾳ ἴσην ἔχῃ τὴν ὑπὸ τῶν ἴσων εὐθειῶν περιεχομένην: καὶ τὴν βάσιν τῇ βάσει ἴσην ἕξει, καὶ τὸ τρίγωνον τῷ τριγώνῳ ἴσον ἔσται, καὶ αἱ λοιπαὶ γωνίαι ταῖς λοιπαῖς γωνίαις ἴσαι ἔσονται, ἑκατέρα ἑκατέρᾳ, ὑφ' ἃς αἱ ἴσαι πλευραὶ ὑποτείνουσιν.

Theorema primum. Propositio 4.

Si duo triangula duo larera duobus lateribus æqualia habeāt, vtrunque vtrique, habeant verò & angulum angulo æqualem

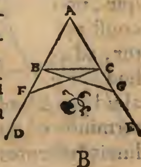
lem ſub ęqualibus rectis lineis contentū: & baſin baſi æqualē habebūt, eritq; triangulum triangulo æquale, ac reliqui anguli reliquis angulis ęquales erunt, vterque vtrique, ſub quibus æqualia latera ſubtenduntur.



τῶν ἰσοσκελῶν τριγώνων αἱ πρὸς τῇ βάσει γω-
νίαι ἴσαι ἀλλήλαις εἰσί. καὶ προσεκβληθεισῶν
τῶν ἴσων εὐθειῶν, αἱ ὑπὸ τὴν βάσιν γωνίαι ἴσαι
ἀλλήλαις ἔσονται.

Theorema 2. Propoſitio 5.

Iſoſcelium triangulorū qui ad baſin ſunt anguli, inter ſe ſunt æquales: & ſi vlterius productæ ſint æquales illæ rectæ lineæ, qui ſub baſi ſunt anguli, inter ſe æquales erunt.

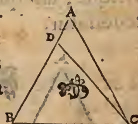


ς

ἐὰν τριγώνου αἱ δύο γωνίαι ἴσαι ἀλλήλαις ὦσι, καὶ αἱ ὑπὸ τὰς ἴσας γωνίας ὑποτείνουσαι πλευραὶ, ἴσαι ἀλλήλαις ἔσονται.

Theorema 3. Propositio 6.

Si triãguli duo anguli ęquales inter ſe fuerint: & ſub æqualibus angulis ſubtenſa latera æqualia inter ſe erunt.

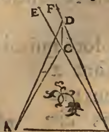


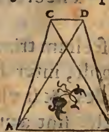
ζ

ἐπὶ τῆς αὐτῆς εὐθείας, δυσὶ ταῖς αὐταῖς εὐθείαις ἄλλαι δύο εὐθεῖαι ἴσαι ἑκατέρα ἑκατέρᾳ οὐ συσταθήσονται, πρὸς ἄλλῳ καὶ ἄλλῳ σημείῳ, ἐπὶ τὰ αὐτὰ μέρη, τὰ αὐτὰ πέρατα ἔχουσαι, ταῖς ἐξ ἀρχῆς εὐθείαις.

Theorema 4. Propositio 7.

Super eadem recta linea, duabus eiſdem rectis lineis aliæ duę rectę lineæ æquales, vtraque vtrique, non conſtituẽtur, ad aliud atq; aliud punctũ, ad eaſdẽ partes; eoſdẽmq; terminos cũ duabus initio ductis rectis lineis habentes.



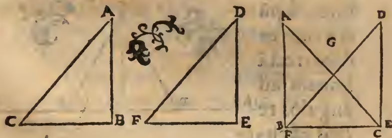


η

Ἐὰν δύο τρίγωνα τὰς δύο πλευρὰς ταῖς δυσὶ πλευραῖς ἴσας ἔχῃ, ἑκατέραν ἑκατέρᾳ, ἔχῃ δὲ καὶ βάσιν τῇ βάσει ἴσην: καὶ τὴν γωνίαν τῇ γωνίᾳ ἴσην ἕξει τὴν ὑπὸ τῶν ἴσων εὐθειῶν περιεχομένην.

Theorema 5. Propositio 8.

Si duo triangula duo latera habuerint duobus lateribus, vtrunq; vtrique, ęqualia, habuerint verò & basin basi æqualẽ: angulum quoque sub æqualibs rectis lineis contentum angulo æqualem habebunt.

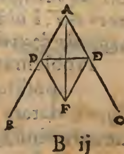


θ

Τὴν δοθεῖσαν γωνίαν εὐθύγραμμον δίχα τεμεῖν.

Problema 4. Propositio 9.

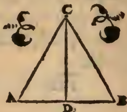
Datum angulum rectilineum bifariam secare.



ι

Τὴν δοθεῖσαν εὐθεῖαν πεπερασμένην, δίχα τεμεῖν.

Problema 5. Propositio 10.



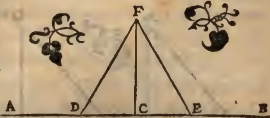
Datam rectam lineam finitam bifariam secare.

ια

τῇ δοθείσῃ εὐθείᾳ, ἀπὸ τοῦ πρὸς αὐτῇ δοθέντος σημείου, πρὸς ὀρθὰς γωνίας εὐθεῖαν γραμμὴν ἀναγεῖν.

Problema 6. Propositio 11.

Data recta linea, à pũcto in ea dato, rectã lineam ad angulos rectos excitare.

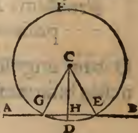


ιβ

Ἐπὶ τὴν δοθεῖσαν εὐθεῖαν ἄπειρον, ἀπὸ τοῦ δοθέντος σημείου, ὃ μή ἐστιν ἐπ' αὐτῆς, κάθετον εὐθεῖαν γραμμὴν ἀγαγεῖν.

Problema 7. Propositio 12.

Super datam rectam lineam infinitã, à dato pun

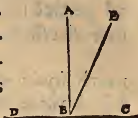


cto quod in ea non est, perpendicularem rectam deducere.

ιγ

Ὡς ἂν εὐθεῖα ἐπ' εὐθεῖαν σταθεῖσα, γωνίας ποιῇ, ἤτοι δύο ὀρθὰς, ἢ δυσὶν ὀρθαῖς ἴσας ποιήσει.

Theorema 6. Propositio 13.



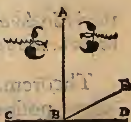
Cùm recta linea super rectam consistens lineã angulos facit, aut duos rectos, aut duobus rectis æquales efficiet.

ιδ

Ἐὰν πρός τινι εὐθείᾳ, καὶ τῷ πρὸς αὐτῇ σημείῳ δύο εὐθεῖαι μὴ ἐπὶ τὰ αὐτὰ μέρη κείμεναι, τὰς ἐφεξῆς γωνίας δυσὶν ὀρθαῖς ἴσας ποιῶσιν, ἐπ' εὐθείας ἔσονται ἀλλήλαις αἱ εὐθεῖαι.

Theorema 7. Propositio 14.

Si ad aliquam rectam lineam, atque ad eius punctum, duæ rectæ lineæ nõ ad easdem partes ductæ, eos qui sunt deinceps ãgulos duobus rectis æquales fecerint, in directum erunt inter se ipsæ rectæ lineæ.

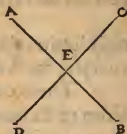


ιε

Ἐὰν δύο εὐθεῖαι τέμνωσιν ἀλλήλας, τὰς κατὰ

κορυφὴν γωνίας, ἴσας ἀλλήλαις ποιήσουσι.

Theorema 8. Propositio 15.

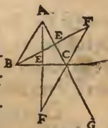


Si duæ rectæ lineæ se mutuò secuerint, ãgulos qui ad verticẽ sunt, æquales inter se efficient.

ιε

παντὸς τριγώνου μιᾶς τῶν πλευρῶν ἐκβληθείσης, ἡ ἐκτὸς γωνία, ἑκατέρας τῶν ἐντὸς καὶ ἀπεναντίον, μείζων ἐστίν.

Theorema 9. Propositio 16.

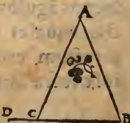


Cuiuscunque trianguli vno latere producto, externus angulus vtroq; interno & opposito maior est.

ιζ

παντὸς τριγώνου αἱ δύο γωνίαι, δύο ὀρθῶν ἐλάσσονές εἰσι, πάντῃ μεταλαμβανόμεναι.

Theorema 10. Propositio 17.

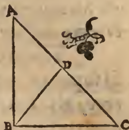


Cuiuscunque trianguli duo anguli duobus rectis sunt minores omnifariã sumpti,

ιη

παντὸς τριγώνου ἡ μείζων πλευρὰ τὴν μείζονα γωνίαν ὑποτείνει.

Theorema.11.Propositio 18.

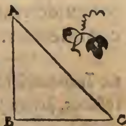


Omnis triãguli maius latus maiorẽ angulum subtendit.

ιθ

παντὸς τριγώνου ὑπὸ τὴν μείζονα γωνίαν ἡ μείζων πλευρὰ ὑποτείνει.

Theorema 12.Propositio 19.

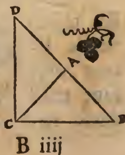


Omnis triãguli maior angulus maiori lateri subtenditur.

κ

παντὸς τριγώνου αἱ δύο πλευραὶ, τῆς λοιπῆς μείζονές εἰσι, πάντῃ μεταλαμβανόμεναι.

Theorema 13. Propositio 20.



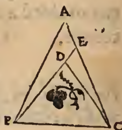
Omnis trianguli duo latera reliquo sunt maiora, quomodocunque assumpta.

κα

Ἐὰν τριγώνου ἐπὶ μιᾶς τῶν πλευρῶν ἀπὸ τῶν περάτων δύο εὐθεῖαι ἐντὸς συσταθῶσιν, αἱ συσταθεῖσαι, τῶν λοιπῶν τοῦ τριγώνου δύο πλευρῶν ἐλάττονες μὲν ἔσονται, μείζονα δὲ γωνίαν περιέξουσι.

Theorema 14. Propositio 21.

Si ſuper trianguli vno latere, ab extremitatibus duæ rectæ lineæ, interius cõſtitutæ fuerint, hæ cõſtitutæ reliquis trianguli duobus lateribus minores quidẽ erunt, maiorem verò angulum continebunt.

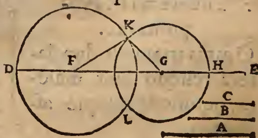


κβ

Ἐκ τριῶν εὐθειῶν, αἵ εἰσιν ἴσαι τρισὶ ταῖς δοθείσαις εὐθείαις, τρίγωνον συστήσασθαι. δεῖ δὴ τὰς δύο τῆς λοιπῆς μείζονας εἶναι, πάντῃ μεταλαμβανομένας, διὰ τὸ καὶ παντὸς τριγώνου τὰς δύο πλευρὰς τῆς λοιπῆς μείζονας εἶναι, πάντῃ μεταλαμβανομένας.

Problema 8. Propoſitio 22.

Ex tribus rectis lineis quæ ſunt trib⁹ datis re-



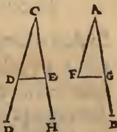
ctis lineis æquales, triangulum cõſtituere. Oportet autem duas reliqua eſſe maiores omnifariam ſumptas: quoniam vniuſcuiuſque trianguli duo latera omnifariam ſumpta reliquo ſunt maiora.

κγ

Πρὸς τῇ δοθείσῃ εὐθείᾳ καὶ τῷ πρὸς αὐτῇ σημείῳ, τῇ δοθείσῃ γωνίᾳ εὐθυγράμμῳ ἴσην γωνίαν εὐθύγραμμον συστήσασθαι.

Problema 9. Propoſitio 23.

Ad datam rectã lineam datúmque in ea pũctum, dato angulo rectilineo æqualem angulum rectilineum conſtituere.

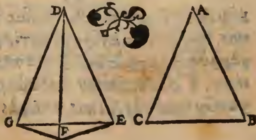


κδ

Ἐὰν δύο τρίγωνα τὰς δύο πλευρὰς ταῖς δυσὶ πλευραῖς ἴσας ἔχῃ, ἑκατέραν ἑκατέρᾳ, τὴν δὲ γωνίαν τῆς γωνίας μείζονα ἔχῃ, τὴν ὑπὸ τῶν ἴσων εὐθειῶν περιεχομένην, καὶ τὴν βάσιν τῆς βάσεως μείζονα ἕξει.

Theorema 15. Propoſitio 24.

Si duo triãgula duo latera duobus lateribus æqua-



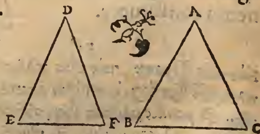
lia habuerint, vtrunque vtrique, angulum verò angulo maiorē ſub æqualibus rectis lineis contētum: & baſin baſi maiorem habebunt.

κε

Ἐὰν δύο τρίγωνα τὰς δύο πλευρὰς ταῖς δυσὶ πλευραῖς ἴσας ἔχῃ, ἑκατέραν ἑκατέρᾳ, τὴν δὲ βάσιν τῆς βάσεως μείζονα ἔχῃ· καὶ τὴν γωνίαν τῆς γωνίας μείζονα ἕξει, τὴν ὑπὸ τῶν ἴσων εὐθειῶν περιεχομένην.

Theorema 16. Propoſitio 25.

Si duo triangula duo latera duobus lateribus ęqualia habuerint, vtrunque vtrique, baſin verò baſi maiorem: & angulum ſub ęqualib⁹ rectis lineis contentū āgulo maiorem habebunt.



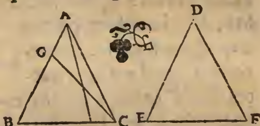
κϛ

Ἐὰν δύο τρίγωνα τὰς δύο γωνίας ταῖς δυσὶ γωνίαις ἴσας ἔχῃ, ἑκατέραν ἑκατέρᾳ, καὶ μίαν πλευρὰν μιᾷ πλευρᾷ ἴσην, ἤτοι τὴν πρὸς ταῖς ἴσαις γωνίαις, ἢ τὴν ὑποτείνουσαν ὑπὸ μίαν τῶν ἴσων γωνιῶν: καὶ τὰς λοιπὰς πλευρὰς ταῖς λοιπαῖς

πλευρᾶς ἴσας ἕξει, ἑκατέραν ἑκατέρᾳ, καὶ τὴν λοιπὴν γωνίαν τῇ λοιπῇ γωνίᾳ.

Theorema 17. Propoſitio 26.

Si duo triangula duos angulos duobus angulis æquales habuerint, vtrunque vtrique, vnúmque latus vni lateri æquale, ſiue quod æqualibus adiacet angulis, ſeu quod vni æqualium angulorum ſubtenditur: & reliqua latera reliquis lateribus æqualia, vtrunque vtrique, & reliquum angulum reliquo angulo æqualem habebunt.

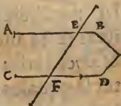


κζ

Ἐὰν εἰς δύο εὐθείας εὐθεῖα ἐμπίπτουσα τὰς ἐναλλὰξ γωνίας ἴσας ἀλλήλαις ποιῇ, παράλληλοι ἔσονται ἀλλήλαις αἱ εὐθεῖαι.

Theorema 18. Propoſitio 27.

Si in duas rectas lineas recta incidens linea alternatim angulos æquales inter ſe fecerit: parallelę erunt inter ſe illæ rectæ lineæ.

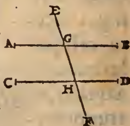


κη

Ἐὰν εἰς δύο εὐθείας εὐθεῖα ἐμπίπτουσα, τὴν ἐκτὸς γωνίαν τῇ ἐντὸς, καὶ ἀπεναντίον, καὶ ἐπὶ τὰ αὐτὰ μέρη ἴσην ποιῇ, ἢ τὰς ἐντὸς καὶ ἐπὶ τὰ αὐτὰ μέρη δυσὶν, ὀρθαῖς ἴσας ποιῇ, παράλληλοι ἔσονται ἀλλήλαις αἱ εὐθεῖαι.

Theorema 19. Propoſitio 28.

Si in duas rectas lineas recta incidens linea, externũ angulum interno, & oppoſito, & ad eaſdem partes æqualem fecerit, aut internos & ad eaſdem partes duobꝰ rectis æquales: parallelæ erunt inter ſe ipſæ rectæ lineæ.

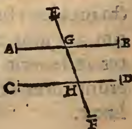


κθ

Ἡ εἰς τὰς παραλλήλους εὐθείας εὐθεῖα ἐμπίπτουσα, τάς τε ἐναλλὰξ γωνίας ἴσας ἀλλήλαις ποιεῖ, καὶ τὴν ἐκτὸς τῇ ἐντὸς καὶ ἀπεναντίον, καὶ ἐπὶ τὰ αὐτὰ μέρη, ἴσην, καὶ τὰς ἐντὸς καὶ ἐπὶ τὰ αὐτὰ μέρη δυσὶν ὀρθαῖς ἴσας.

Theorema 20. Propoſitio 29.

In paralleleas rectas lineas recta incidẽs linea, & alternatim ãgulos inter ſe ęquales efficit & externum interno & oppo



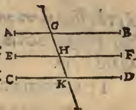
ſito & ad eaſdem partes æqualem, & internos & ad eaſdem partes duobus rectis æquales facit.

λ

Αἱ τῇ αὐτῇ εὐθείᾳ παράλληλοι, καὶ ἀλλήλαις εἰσὶ παράλληλοι.

Theorema 21. Propoſitio 30.

Quæ eidem rectæ lineæ parallelæ, & inter ſe ſunt parallelæ.

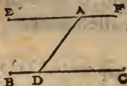


λα

Ἀπὸ τοῦ δοθέντος σημείου, τῇ δοθείσῃ εὐθείᾳ παράλληλον εὐθεῖαν γραμμὴν ἀγαγεῖν.

Problema 10. Propoſitio 31.

A dato puncto datæ rectæ lineę parallelam rectam lineam ducere.



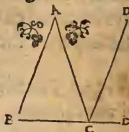
λβ

Παντὸς τριγώνου μιᾶς τῶν πλευρῶν προσεκβληθείσης, ἡ ἐκτὸς γωνία δυσὶ ταῖς ἐντὸς καὶ ἀπεναντίον ἴση ἐστί. καὶ αἱ ἐντὸς τοῦ τριγώνου τρεῖς γωνίαι δυσὶν ὀρθαῖς ἴσαι εἰσίν.

Theorema 22. Propoſitio 32.

Cuiuſcunque trianguli vno latere vlte-

rius producto: externus angulus duobus internis & oppositis est æqualis. Et trianguli tres interni anguli duobus sunt rectis æquales.



λγ

Αἱ τὰς ἴσας καὶ παραλλήλους ἐπὶ τὰ αὐτὰ μέρη ἐπι-
ζευγνύουσαι εὐθεῖαι, καὶ αὐταὶ ἴσαι τε καὶ παράλ-
ληλοί εἰσιν.

Theorema 23. Propositio 33.

Rectæ lineæ quę æquales & parallelas lineas ad partes easdem coniungũt, & ipsæ ęquales & parallelę sunt.

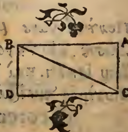


λδ

Τῶν παραλληλογράμμων χωρίων αἱ ἀπεναν-
τίον πλευραί τε καὶ γωνίαι ἴσαι ἀλλήλαις εἰσί·
καὶ ἡ διάμετρος αὐτὰ δίχα τέμνει.

Theorema 24. Propositio 34.

Parallelogrammorũ spatiorum ęqualia sunt inter se quę ex aduerso & latera & anguli: atque illa bi-

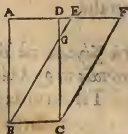


fariam ſecat diameter.

λε

τὰ παραλληλόγραμμα, τὰ ἐπὶ τῆς αὐτῆς βάσεως ὄντα, καὶ ἐν ταῖς αὐταῖς παραλλήλοις, ἴσα ἀλλήλοις ἐστίν.

Theorema 25. Propoſitio 35.



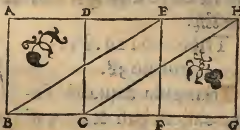
Parallelogramma ſuper eadem baſi & in eiſdem parallelis conſtituta, inter ſe ſunt ęqualia.

λϛ

τὰ παραλληλόγραμμα, τὰ ἐπὶ τῶν ἴσων βάσεων ὄντα, καὶ ἐν ταῖς αὐταῖς παραλλήλοις, ἴσα ἀλλήλοις ἐστί.

Theorema 26. Propoſitio 36.

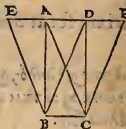
Parallelogramma ſuper ęqualibus baſibus & in eiſdem parallelis cõſtituta, inter ſe ſunt ęqualia.



λζ

τὰ τρίγωνα, τὰ ἐπὶ τῆς αὐτῆς βάσεως ὄντα καὶ ἐν ταῖς αὐταῖς παραλλήλοις, ἴσα ἀλλήλοις ἐστίν.

Theorema 27. Propositio 37.

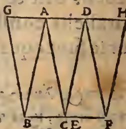


Triãgula super eadem basi constituta, & in eisdem parallelis, inter se sunt æqualia.

λη

τὰ τρίγωνα τὰ ἐπὶ τῆς ἴσων βάσεων καὶ ἐν ταῖς αὐταῖς παραλλήλοις, ἴσα ἀλλήλοις ἐστίν.

Theorema 28. Propositio 38.

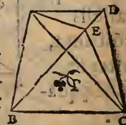


Triangula super æqualibus basibus constituta & in eisdem parallelis, inter se sunt æqualia.

λθ

τὰ ἴσα τρίγωνα τὰ ἐπὶ τῆς αὐτῆς βάσεως ὄντα, καὶ ἐπὶ τὰ αὐτὰ μέρη καὶ ἐν ταῖς αὐταῖς παραλλήλοις ἐστίν.

Theorema 29. Proposiio 38.



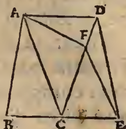
Triangula æqualia super eadem basi & ad easdem partes constituta: & in eisdem sunt parallelis.

μ

τὰ ἴσα τρίγωνα τὰ ἐπὶ τῆς ἴσων βάσεων ὄντα καὶ ἐπὶ

ἐπὶ τὰ αὐτὰ μέρη, καὶ ἐν ταῖς αὐταῖς παραλλή-
λοις ἐστίν.

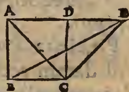
Theor.30.Propo.40.
Triangula æqualia ſuper æqualibus baſibus & ad eaſdem partes cõſtituta, & in eiſdem ſunt parallelis.



μα

Ἐὰν παραλληλόγραμμον τριγώνῳ βάσιν τε ἔχῃ τὴν αὐτήν, καὶ ἐν ταῖς αὐταῖς παραλλήλοις ᾖ, διπλάσιον ἔσται τὸ παραλληλόγραμμον τοῦ τριγώνου.

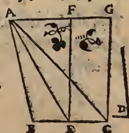
Theor.31.Propo.41.
Si parallelogrãmum cũ triangulo eandem baſin habuerit, in eiſdémq; fuerit parallelis, duplum erit parallelogrammũ ipſius trianguli.



μβ

Τῷ δοθέντι τριγώνῳ ἴσον παραλληλόγραμμον συστήσασθαι, ἐν τῇ δοθείσῃ εὐθυγράμμῳ γωνίᾳ.

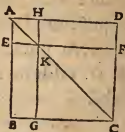
Probl.11.Propo.42.
Dato triãgulo ęquale parallelogrãmum cõſtituere in dato angulo rectilineo.



μγ

παντὸς παραλληλογράμμου, τῶν περὶ τὴν διάμετρον παραλληλογράμμων τὰ παραπληρώματα, ἴσα ἀλλήλοις ἐστίν.

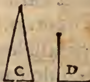
Theor. 32. Propo. 43.



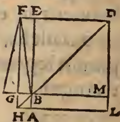
In omni parallelogrammo, complementa eorũ quæ circa diametrũ ſunt parallelogrammorũ, inter ſe ſunt æqulia.

μδ

Παρὰ τὴν δοθεῖσαν εὐθεῖαν, τῷ δοθέντι τριγώνῳ ἴσον παραλληλόγραμμον παραβαλεῖν ἐν τῇ δοθείσῃ γωνίᾳ εὐθυγράμμῳ.



Ploble.12. Propo.44.



Ad datam rectam lineã, dato triãgulo æquale parallelogrammum applicare in dato ãgulo rectilineo.

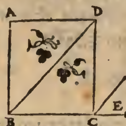
με

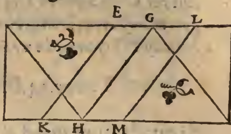
Τῷ δοθέντι εὐθυγράμμῳ ἴσον παραλληλόγραμμον συστήσασθαι ἐν τῇ δοθείσῃ εὐθυγράμμῳ γωνίᾳ.



Proble.13.Propo.45.

Dato rectilineo æquale parallelogrãmũ constituere in dato angulo rectilineo.



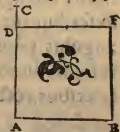


μϛ.

Ἀπὸ τῆς δοθείσης εὐθείας τετράγωνον ἀναγράψαι.

Probl.14.Propo.46.

A data recta linea quadratum describere.



μζ

Ἐν τοῖς ὀρθογωνίοις τριγώνοις τὸ ἀπὸ τῆς τὴν ὀρθὴν γωνίαν ὑποτεινούσης πλευρᾶς τετράγωνον, ἴσον ἐστὶ τοῖς ἀπὸ τῶν τὴν ὀρθὴν γωνίαν περιεχουσῶν πλευρῶν τετραγώνοις.

Theor.33.Propo.47.

In rectangulis triangulis, quadratum quod à latere rectum angulum subtendente describitur, æquale est eis quæ à lateribus



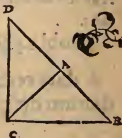
rectum angulum continentibus.

μη

ἐὰν τριγώνου τὸ ἀπὸ μιᾶς τῶν πλευρῶν τετράγωνον ἴσον ᾖ τοῖς ἀπὸ τῶν λοιπῶν τοῦ τριγώνου δύο πλευρῶν τετραγώνοις, ἡ περιεχομένη γωνία ὑπὸ τῶν λοιπῶν τοῦ τριγώνου δύο πλευρῶν, ὀρθή ἐστι.

Theor.34.Propo.48.

Si quadratum quod ab vno laterum triã guli deſcribitur, æquale ſit eisquæ à reliquis trianguli lateribus deſcribuntur, quadratis: angulus cõprehenſus ſub reliquis duobus trianguli lateribus, rectus eſt.



Finis Elementi primi.



ΕΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙ̃ΟΝ
ΔΕΥ´ΤΕΡΟΝ.

EVCLIDIS ELEMEN-
TVM SECVNDVM.

ὅροι.

α

ΠΑ̃Ν παραλληλόγραμμον ὀρθογώνιον, περιέχεσθαι λέγεται ὑπὸ δύο τῶν τὴν ὀρθὴν γωνίαν περιεχουσῶν εὐθειῶν.

DEFINITIONES.

I

Omne parallelogrammũ rectangulum cõtineri dicitur ſub rectis duabus lineis, quæ rectum comprehendunt angulum.

β

Παντὸς δὲ παραλληλογράμμου χωρίου τῶν περὶ τὴν διάμετρον αὐτοῦ, ἓν παραλληλογράμμων

ὁποιονοῦν σὺν τοῖς δυσὶ παραπληρώμασι, γνώμων καλείσθω.

2

In omni parallelogrammo ſpatio, vnũ quodlibet eorum quæ circa diametrum illius ſunt parallelogrãmorũ, cum duobus complementis, Gnomo vocetur.

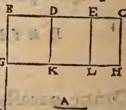


Πρότασις α.

Ἐὰν ὦσι δύο εὐθεῖαι, τμηθῇ δὲ ἡ ἑτέρα αὐτῶν εἰς ὁσαδηποτοῦν τμήματα, τὸ περιεχόμενον ὀρθογώνιον ὑπὸ τῶν δύο εὐθειῶν, ἴσον ἐστὶ τοῖς ὑπό τε τῆς ἀτμήτου καὶ ἑκάστου τῶν τμημάτων περιεχομένοις ὀρθογωνίοις.

Theor.1.Propo.1.

Si fuerint duæ rectæ lineæ, ſecetúrque ipſarum altera in quotcũque ſegmenta: rectangulum comprehenſum ſub illis duabus rectis lineis, æquale eſt eis rectangulis quæ ſub inſecta & quolibet ſegmentorum comprehenduntur.



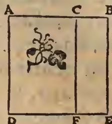
β

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ ὡς ἔτυχε, τὰ ἀπὸ

τῆς ὅλης καὶ ἑκατέρου τῶν τμημάτων περιεχόμενα ὀρθογώνια ἴσα ἐστὶ τῷ ἀπὸ τῆς ὅλης τετραγώνῳ.

Theor.2.Propo.2.

Si recta linea secta sit vtcunque, rectangula quæ sub tota & quolibet segmẽtorum comprehenduntur, æqualia sunt ei, quod à tota fit, quadrato.

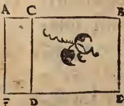


γ

Ἐὰν εὐθεῖα γραμμὴ ὡς ἔτυχε τμηθῇ, τὸ ὑπὸ τῆς ὅλης καὶ ἑνὸς τῶν τμημάτων περιεχόμενον ὀρθογώνιον, ἴσον ἐστὶ τῷ τε ὑπὸ τῶν τμημάτων περιεχομένῳ ὀρθογωνίῳ, καὶ τῷ ἀπὸ τοῦ προειρημένου τμήματος τετραγώνῳ.

Theor.3.Propo.3.

Si recta linea secta sit vtcunque, rectangulum sub tota & vno segmentorum cõprehensum, æquale est & illi quod sub segmẽtis cõprehenditur rectangulo, & illi, quod à prædicto segmento describitur, quadrato.



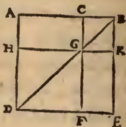
δ

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ ὡς ἔτυχε, τὸ ἀπὸ τῆς ὅλης τετράγωνον, ἴσον ἔσται τοῖς τε ἀπὸ τῶν τμη-

μάτων τε τετραγώνοις, καὶ τῷ δὶς ὑπὸ τῶν τμημάτων περιεχομένῳ ὀρθογωνίῳ.

Theor. 4. Propo. 4.

Si recta linea secta sit vtcunque: quadratum quod à tota describitur, æquale est & illis quæ à segmentis describuntur quadratis, & ei quod bis sub segmentis comprehẽditur, rectangulo.

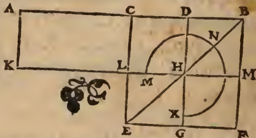


ε

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ εἰς ἴσα καὶ ἄνισα, τὸ ὑπὸ τῶν ἀνίσων τῆς ὅλης τμημάτων περιεχόμενον ὀρθογώνιον, μετὰ τοῦ ἀπὸ τῆς μεταξὺ τῶν τομῶν τετραγώνου, ἴσον ἐστὶ τῷ ἀπὸ τῆς ἡμισείας τετραγώνῳ.

Theor. 5. Propo. 5.

Si recta linea secetur in æqualia & non æqualia: rectangulum sub inæqualibus segmentis totius comprehensum, vnà cum quadrato, quod ab intermedia sectionum, ęquale est ei quod à dimidia describitur, quadrato.

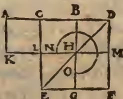


ς

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ δίχα, προστεθῇ δέ τις αὐτῇ εὐθεῖα ἐπ' εὐθείας, τὸ ὑπὸ τῆς ὅλης σὺν τῇ προσκειμένῃ, καὶ τῆς προσκειμένης περιεχόμενον ὀρθογώνιον, μετὰ τοῦ ἀπὸ τῆς ἡμισείας τετραγώνου, ἴσον ἐστὶ τῷ ἀπὸ τῆς συγκειμένης ἔκ τε τῆς ἡμισείας καὶ τῆς προσκειμένης, ὡς ἀπὸ μιᾶς, ἀναγραφέντι τετραγώνῳ.

Theor.6.Propo.6.

Si recta linea bifariam secetur, & illi recta quædam linea in rectum adiiciatur, rectangulum cōprehensum sub tota cū adiecta & adiecta simul & quadratum à dimidia, æquale est quadrato à linea, quę tum ex dimidia, tum ex adiecta componitur, tanquam ab vna descripto.



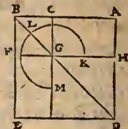
ζ

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ ὡς ἔτυχε, τὸ ἀπὸ τῆς ὅλης, καὶ τὸ ἀφ' ἑνὸς τῶν τμημάτων, τὰ συναμφότερα τετράγωνα ἴσα ἐστὶ τῷ τε δὶς ὑπὸ τῆς ὅλης καὶ τοῦ εἰρημένου τμήματος περιεχομένῳ ὀρθογωνίῳ, καὶ τῷ ἀπὸ τοῦ λοιποῦ τμήματος τετραγώνῳ.

Theor.7.Propo.7.

Si recta linea secetur vtcunque: quod à

tota, quódque ab vno ſegmentorum, vtraque ſimul quadrata, æqualia ſunt & illi quod bis ſub tota & dicto ſegmẽto comprehenditur, rectangulo, & illi quod à reliquo ſegmẽto fit, quadrato.

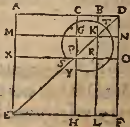


η

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ ὡς ἔτυχε, τὸ τετράκις ὑπὸ τῆς ὅλης καὶ ἑνὸς τῶν τμημάτων περιεχόμενον ὀρθογώνιον, μετὰ τοῦ ἀπὸ τοῦ λοιποῦ τμήματος τετραγώνου, ἴσον ἐστὶ τῷ τε ἀπὸ τῆς ὅλης καὶ τοῦ εἰρημένου τμήματος, ὡς ἀπὸ μιᾶς, ἀναγραφέντι τετραγώνῳ.

Theor.8.Propo.8.

Si recta linea ſecetur vtcunque: rectangulum quater cõprehenſum ſub tota & vno ſegmẽtorum, cum eo quod à reliquo ſegmento fit, quadrato, æquale eſt ei quod à tota & dicto ſegmẽto, tanquã ab vna linea deſcribitur, quadrato.



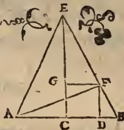
θ

Ἐὰν εὐθεῖα γραμμὴ τμηθῇ εἰς ἴσα καὶ ἄνισα, τὰ

ἀπὸ τῶν ἀνίσων τῆς ὅλης τμημάτων τετράγωνα, διπλάσιά ἐστι τοῦ τε ἀπὸ τῆς ἡμισείας, καὶ τοῦ ἀπὸ τῆς μεταξὺ τῶν τομῶν τετραγώνου.

Theor.9.Propo.9.

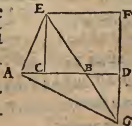
Si recta linea secetur in æqualia & non æqualia: quadrata quæ ab inæqualibus totius segmentis fiunt, duplicia sunt & eius quod à dimidia, & eius quod ab intermedia sectionũ fit, quadratorum.



Ἐὰν εὐθεῖα γραμμὴ τμηθῇ δίχα, προστεθῇ δέ τις αὐτῇ εὐθεῖα ἐπ' εὐθείας, τὸ ἀπὸ τῆς ὅλης σὺν τῇ προσκειμένῃ, καὶ τὸ ἀπὸ τῆς προσκειμένης τὰ συναμφότερα τετράγωνα, διπλάσιά ἐστι τοῦ τε ἀπὸ τῆς ἡμισείας, καὶ τοῦ ἀπὸ τῆς συγκειμένης ἔκ τε τῆς ἡμισείας καὶ τῆς προσκειμένης, ὡς ἀπὸ μιᾶς ἀναγραφέντος τετραγώνου.

Theor.10. Propo. 10.

Si recta linea secetur bifariam, adiiciatur autẽ ei in rectũ quæpiã recta linea: quod à tota cũ adiuncta, & quod ab adiuncta, vtraque simul quadrata, duplicia sunt & e-



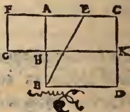
ius quod à dimidia, & eius quod à composita ex dimidia & adiuncta, tanquam ab vna descriptum sit, quadratorum.

ια

Τὴν δοθεῖσαν εὐθεῖαν τεμεῖν, ὥστε τὸ ὑπὸ τῆς ὅλης καὶ τοῦ ἑτέρου τῶν τμημάτων περιεχόμενον ὀρθογώνιον ἴσον εἶναι τῷ ἀπὸ τοῦ λοιποῦ τμήματος τετραγώνῳ.

Probl.1.Propo.11.

Datam rectam linean secare, vt comprehensum sub tota & altero segmentorum rectangulum, æquale sit ei quod à reliquo segmento fit, quadrato.

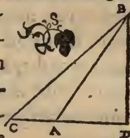


ιβ

Ἐν τοῖς ἀμβλυγωνίοις τριγώνοις, τὸ ἀπὸ τῆς τὴν ἀμβλεῖαν γωνίαν ὑποτεινούσης πλευρᾶς τετράγωνον, μεῖζόν ἐστι τῶν ἀπὸ τῶν τὴν ἀμβλεῖαν περιεχουσῶν πλευρῶν, τετραγώνων, τῷ περιεχομένῳ δὶς ὑπό τε μιᾶς τῶν περὶ τὴν ἀμβλεῖαν γωνίαν, ἐφ' ἣν ἐκβληθεῖσαν ἡ κάθετος πίπτει, καὶ τῆς ἀπολαμβανομένης ἐκτὸς ὑπὸ τῆς καθέτου πρὸς τῇ ἀμβλείᾳ γωνίᾳ.

Theor.11.Propo.12.

In amblygoniis triangulis, quadratum quod fit à latere angulum obtusum subtendente, maius est quadratis quæ fiunt à lateribus obtusum angulum comprehendentibus, pro quantitate rectanguli bis comprehensi & ab vno laterum quæ sunt circa obtusum angulum, in quod, cùm protractũ fuerit, cadit perpendicularis, & ab assumpta exterius linea sub per pendiculari prope angulum obtusum.

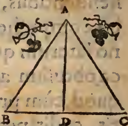


ιγ

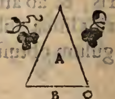
Ἐν τοῖς ὀξυγωνίοις τριγώνοις, τὸ ἀπὸ τῆς τὴν
ὀξεῖαν γωνίαν ὑποτεινούσης πλευρᾶς τετράγω-
νον, ἔλαττόν ἐστι τῶν ἀπὸ τῶν τὴν ὀξεῖαν γωνίαν
περιεχουσῶν πλευρῶν τετραγώνων, τῷ περιε-
χομένῳ δὶς ὑπό τε μιᾶς τῶν περὶ τὴν ὀξεῖαν γω-
νίαν, ἐφ' ἣν ἡ κάθετος πίπτει, καὶ τῆς ἀπολαμ-
βανομένης ἐντὸς ὑπὸ τῆς καθέτου πρὸς τῇ ὀξείᾳ
γωνίᾳ.

Theorema 12. Propo. 13.

In oxygoniis triangulis, quadratum à latere angulum acutum subtendente, minus est quadratis quæ fiunt à lateribus acutum angulnm comprehendentibus, pro quantitate rectanguli bis comprehẽsi, & ab vno laterum, quæ sunt circa acutum angulum, in quod perpendicularis cadit, & ab assumpta interius linea sub perpendiculari prope acutũ angulum.



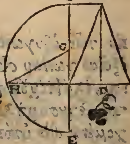
ιδ



τῷ δοθέντι εὐθυγράμμῳ ἴσον τετράγωνον συστήσασθαι.

Probl. 2. Propo. 14.

Dato rectilineo æquale quadratum constituere.



Elementi secundi finis.



ΕΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙ̃ΟΝ ΤΡΊΤΟΝ.

EVCLIDIS ELEMEN-
TVM TERTIVM.

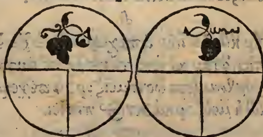
ὍΡΟΙ. α.

Ἴσοι κύκλοι εἰσὶν, ὧν αἱ διάμετροι εἰσὶ ἴσαι: ἢ ὧν αἱ ἐκ τῶν κέντρων ἴσαι εἰσίν.

DEFINITIONES.

I

Æquales circuli, ſunt quorum diametri ſunt æquales, vel quorum quæ ex cẽtris rectæ lineæ ſunt æquales.



β

Εὐθεῖα κύκλου ἐφάπτεσθαι λέγεται, ἥτις ἁπτομένη τοῦ κύκλου, καὶ ἐκβαλλομένη, οὐ τέμνει τὸν κύκλον.

2

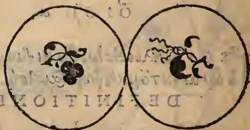


Recta linea circulum tangere dicitur, quæ cùm circulum tangat, si producatur, circulum non secat.

γ

Κύκλοι ἐφάπτεσθαι ἀλλήλων λέγονται, οἵτινες ἁπτόμενοι ἀλλήλων, οὐ τέμνουσιν ἀλλήλους.

3



Circuli sese mutuò tangere dicũtur: qui sese mutuo tangẽtes, sese mutuò non secant.

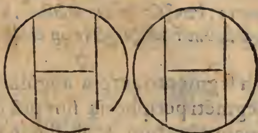
δ

Ἐν κύκλῳ ἴσον ἀπέχειν τοῦ κέντρου εὐθεῖαι λέγονται, ὅταν αἱ ἀπὸ τοῦ κέντρου ἐπ' αὐτὰς κάθετοι ἀγόμεναι ἴσαι ὦσι: μεῖζον δὲ ἀπέχειν λέγεται, ἐφ' ἣν ἡ μείζων κάθετος πίπτει.

4

In circulo æqualiter distare à centro rectæ lineæ dicuntur, cùm perpendiculares,

res, quæ à centro in ipſas ducũtur, ſunt æquales. Lõgius autem abeſſe illa dicitur, in quã maior perpendicularis cadit.



ε

Τμῆμα κύκλου, ἐστὶ τὸ περιεχόμενον σχῆμα ὑπό τε εὐθείας καὶ κύκλου περιφερείας.

5

Segmentum circuli, eſt figura quæ ſub recta linea & circuli peripheria comprehenditur.



5

Τμήματος δὲ γωνία ἐστὶν, ἡ περιεχομένη ὑπό τε εὐθείας, καὶ κύκλου περιφερείας.

6

Segmenti autem angulus eſt, qui ſub recta linea & circuli peripheria comprehenditur.

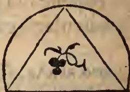
ζ

Ἐν τμήματι δὲ γωνία ἐστὶν, ὅταν ἐπὶ τῆς περιφερείας τοῦ τμήματος ληφθῇ τι σημεῖον, καὶ ἀπ' αὐτοῦ ἐπὶ τὰ πέρατα τῆς εὐθείας, ἡ ἐστὶ βάσις τοῦ τμή-

μαρς, ἐπεζευχθῶσιν εὐθεῖαι, ἡ περιεχομένη γωνία ὑπὸ τῶν ἐπιζευχθεισῶν εὐθειῶν.

7

In ſegmento autem angulus eſt, cùm in ſegmẽti peripheria ſumptũ fuerit quodpiam punctum, & ab illo in terminos rectæ eius lineæ, quæ ſegmẽti baſis eſt, adiunctæ fuerint rectæ lineæ: is, inquã, angulus ab adiunctis illis lineis comprehenſus.

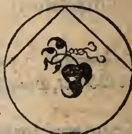


η

Ὅταν δὲ αἱ περιέχουσαι τὴν γωνίαν εὐθεῖαι ἀπολαμβάνωσί τινα περιφέρειαν, ἐπ' ἐκείνης λέγεται βεβηκέναι ἡ γωνία.

8

Cùm verò comprehendentes angulum rectæ lineæ aliquam aſſumũt peripheriã, illi angulus inſiſtere dicitur.

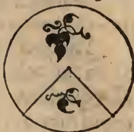


θ

Τομεὺς δὲ κύκλου ἐστὶν, ὅταν πρὸς τῷ κέντρῳ αὐτοῦ τοῦ κύκλου συσταθῇ ἡ γωνία, τὸ περιεχόμενον σχῆμα ὑπό τε τῶν τὴν γωνίαν περιεχουσῶν εὐθειῶν καὶ τῆς ἀπολαμβανομένης ὑπ' αὐτῶν περιφερείας.

9

Sector autem circuli est, cùm ad ipsius circuli centrum constitutus fuerit angulus, cõprehensa nimirũ figura & à rectis lineis angulũ cõtinentibus, & à peripheria ab illis assumpta.

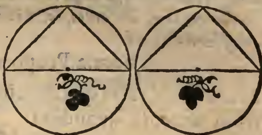


ι

ὅμοια τμήματα κύκλου ἐστὶν, τὰ δεχόμενα γωνίας ἴσας: ἢ ἐν οἷς αἱ γωνίαι ἴσαι ἀλλήλαις εἰσίν.

10

Similia circuli segmenta sunt, quæ angulos capiũt æquales: aut in quibus anguli inter se sunt æquales.



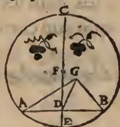
Προτάσεις.

α

Τοῦ δοθέντος κύκλου τὸ κέντρον εὑρεῖν.

Probl.I. Propo.I.

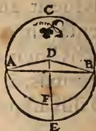
Dati circuli centrum reperire.



β

Ἐὰν κύκλου ἐπὶ τῆς περιφερείας ληφθῇ δύο τυχόντα σημεῖα, ἡ ἐπὶ αὐτὰ σημεῖα ἐπιζευγνυμένη εὐθεῖα, ἐντὸς πεσεῖται τοῦ κύκλου.

Theo.1.Propo.2.



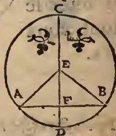
Si in circuli peripheria duo quælibet puncta accepta fuerint, recta linea quæ ad ipsa puncta adiungitur, intra circulum cadet.

γ

Ἐὰν ἐν κύκλῳ εὐθεῖα τις διὰ τοῦ κέντρου, εὐθεῖάν τινα μὴ διὰ τοῦ κέντρου δίχα τέμνῃ: καὶ πρὸς ὀρθὰς αὐτὴν τεμεῖ καὶ ἐὰν πρὸς, ὀρθὰς αὐτὴν τέμνῃ, καὶ δίχα αὐτὴν τεμεῖ.

Theor.2.Propo.3.

Si in circulo recta quædam linea per centrum extensa quandam non per centrum extensam bifariam secet: & ad angulos rectos ipsam secabit. Et si ad angulos rectos eam secet, bifariam quoque eam secabit.

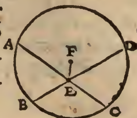


δ

Ἐὰν ἐν κύκλῳ δύο εὐθεῖαι τέμνωσιν ἀλλήλας,

μὴ διὰ τοῦ κέντρου οὖσαι, οὐ τέμνουσιν ἀλλήλας δίχα.

Theo.3.Propo.4.

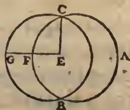


Si in circulo duæ rectæ lineæ sese mutuò secent nō per centrum extensæ, sese mutuò bifariam nō secabunt.

ε

Ἐὰν δύο κύκλοι τέμνωσιν ἀλλήλους, οὐκ ἔσται αὐτῶν τὸ αὐτὸ κέντρον.

Theor.4.Propo.5.

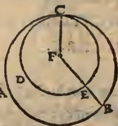


Si duo circuli sese mutuò secent, non erit illorum idem centrum.

ς

Ἐὰν δύο κύκλοι ἐφάπτωνται ἀλλήλων ἐντὸς, οὐκ ἔσται αὐτῶν τὸ αὐτὸ κέντρον.

Theor.5.Propo.6.



Si duo circuli sese mutuò interius tangant, eorum non erit idem centrum.

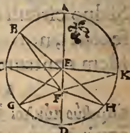
ζ

Ἐὰν κύκλου ἐπὶ τῆς διαμέτρου ληφθῇ τι σημεῖον, ὃ μή ἐστι κέντρον τοῦ κύκλου, ἀπὸ δὲ τοῦ σημείου προσπί-

πίπτωσιν εὐθεῖαί τινες πρὸς τὸν κύκλον: μεγίστη μὲν ἔσται ἐφ' ἧς τὸ κέντρον, ἐλαχίστη δὲ ἡ λοιπή: τῶν δ' ἄλλων ἀεὶ ἡ ἔγγιον τῆς διὰ τοῦ κέντρου τῆς ἀπώτερον μείζων ἐστί. δύο δὲ μόνον εὐθεῖαι ἴσαι ἀπὸ τοῦ αὐτοῦ σημείου προσπεσοῦνται πρὸς τὸν κύκλον, ἐφ' ἑκάτερα τῆς ἐλαχίστης.

Theor. 6. Propo. 7.

Si in diametro circuli quodpiam ſumatur punctum, quod circuli centrum non ſit, ab eóque pũcto in circulum quædam rectæ lineæ cadant: maxima quidem erit ea in qua centrum, minima verò reliqua: aliarum vero propinquior illi quæ per centrum ducitur, remotiore ſemper maior eſt. Duæ autem ſolùm rectæ lineæ æquales ab eodem puncto in circulum cadunt, ad vtraſque partes minimæ.



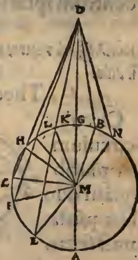
H

ἐὰν κύκλου ληφθῇ τι σημεῖον ἐκτὸς, ἀπὸ δὲ τοῦ σημείου πρὸς τὸν κύκλον διαχθῶσιν εὐθεῖαί τινες, ὧν μία μὲν διὰ τοῦ κέντρου, αἱ δὲ λοιπαὶ ὡς ἔτυχε: τῶν μὲν πρὸς τὴν κοίλην περιφέρειαν προσπιπτουσῶν εὐθειῶν, μεγίστη μὲν ἡ διὰ τοῦ κέντρου, τῶν δὲ ἄλλων ἀεὶ ἡ ἔγγιον τῆς διὰ τοῦ κέντρου, τῆς ἀπώτερον μεί-

ζων ἐστί. τῶν δὲ πρὸς τὴν κυρτὴν περιφέρειαν προσπιπτουσῶν εὐθειῶν, ἐλαχίστη μέν ἐστιν ἡ μεταξὺ τοῦ τε σημείου καὶ τῆς διαμέτρου. τῶν δὲ ἄλλων ἀεὶ ἡ ἔγγιον τῆς ἐλαχίστης, τῆς ἀπώτερόν ἐστι ἐλάττων. δύο δὲ μόνον εὐθεῖαι ἴσαι προσπεσοῦνται ἀπὸ τοῦ σημείου πρὸς τὸν κύκλον ἐφ' ἑκάτερα τῆς ἐλαχίστης.

Theor.7.Propo.8.

Si extra circulũ ſumatur punctum quodpiam, ab eóque puncto ad circulum deducantur rectæ quædam lineæ, quarum vná quidem per centrum protendatur, reliquæ verò vt libet: in cauam peripheriam cadentium rectarum linearum maxima quidem eſt illa, quæ per cẽtrum ducitur: aliarum autẽ propinquior ei, quæ per centrũ trãſit, remotiore ſemper maior eſt. In cõuexam verò peripheriam cadentium rectaaum linearum, minima quidem eſt illa, quæ inter punctum & diametrum interponitur: aliarum autem, ea quæ propinquior eſt mininæ, remotiore ſemper minor eſt. Duæ autem tantùm rectę lineę æquales ab eo



puncto in ipsum circulum cadunt, ad vtrasque partes minimæ.

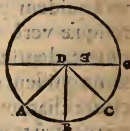
θ

Ἐὰν κύκλου ληφθῇ τι σημεῖον ἐντὸς, ἀπὸ δὲ τοῦ σημείου πρὸς τὸν κύκλον προσπίπτωσιν πλείους ἢ δύο εὐθεῖαι ἴσαι, τὸ ληφθὲν σημεῖον, κέντρον ἐστὶ τοῦ κύκλου.

Theor.8.Propo.9.

Si in circulo acceptum fuerit punctum aliquod, & ab eo puncto ad circulum cadat plures quàm duæ rectę lineę æquales, acceptum punctum centrum ipsius est circuli.

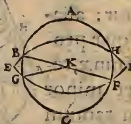


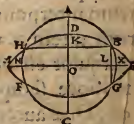


Κύκλος κύκλον οὐ τέμνει κατὰ πλείονα σημεῖα, ἢ δύο.

Theor.9.Propo.10.

Circulus circulum in plurib⁹ quàm duobus pũctis non secat.



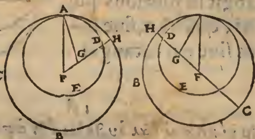


ια

Ἐὰν δύο κύκλοι ἐφάπτωνται ἀλλήλων ἐντὸς, καὶ ληφθῇ αὐτῶν τὰ κέντρα, ἡ ἐπὶ τὰ κέντρα αὐτῶν ἐπιζευγνυμένη εὐθεῖα καὶ ἐκβαλλομένη, ἐπὶ τὴν συναφὴν πεσεῖται τῶν κύκλων.

Theor.10.Propo.11.

Si duo circuli ſeſe intus contingant, atque accepta fuerint eorum cẽtra, ad eorum cẽtra adiuncta recta linea & producta in contactum circulorum cadet.

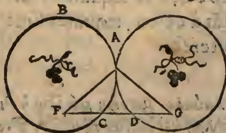


ιβ

Ἐὰν δύο κύκλοι ἅπτωνται ἀλλήλων ἐκτὸς, ἡ ἐπὶ τὰ κέντρα αὐτῶν ἐπιζευγνυμένη, διὰ τῆς ἐπαφῆς ἐλεύσεται.

Theor.11.Propo.12.

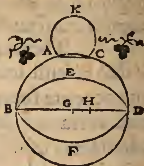
Si duo circuli ſeſe exterius contingant, linea recta quę ad cẽtra eorum adiũgitur, per contactum illũ tranſibit.



ιγ

Κύκλος κύκλου οὐκ ἐφάπτεται πλείονα σημεῖα ἢ καθ' ἕν, ἐάντε ἐντὸς ἐάντε ἐκτὸς ἐφάπτηται.

Theor. 12. Propo. 13.

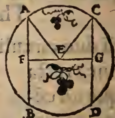


Circulus circulũ non tangit in pluribus pũctis, quã vno, ſiue intus ſiue extra tangat.

ιδ

Ἐν κύκλῳ αἱ ἴσαι εὐθεῖαι ἴσον ἀπέχουσιν ἀπὸ τοῦ κέντρου. καὶ αἱ ἴσον ἀπέχουσαι ἀπὸ τοῦ κέντρου, ἴσαι ἀλλήλαις εἰσίν.

Theor. 13. Propo. 14.



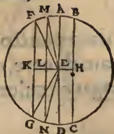
In circulo æquales rectæ lineę ęqualiter diſtãt à cẽtro. Et quæ æqualiter diſtãt à cẽtro, æquales ſunt inter ſe.

ιε

Ἐν κύκλῳ μεγίστη μέν ἐστιν ἡ διάμετρος, τῶν δὲ ἄλλων ἀεὶ ἡ ἔγγιον τοῦ κέντρου, τῆς ἀπώτερον μείζων ἐστίν.

Theor. 14. Propo. 15.

In circulo maxima quidem linea est diameter: aliarum autem propinquior centro, remotiore semper maior.

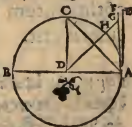


ιε

Ἡ τῇ διαμέτρῳ τοῦ κύκλου πρὸς ὀρθὰς ἀπ' ἄκρας ἀγομένη, ἐκτὸς πεσεῖται τοῦ κύκλου, καὶ εἰς τὸν μεταξὺ τῆς τε εὐθείας καὶ τῆς περιφερείας, ἑτέρα εὐ- τόπον θεῖα οὐ παρεμπεσεῖται· καὶ ἡ μὲν τοῦ ἡμικυκλίου γωνία, ἁπάσης ὀξείας γωνίας εὐθυγράμμου μείζων ἐστίν, ἡ δὲ λοιπή, ἐλάττων.

Theor. 15. Propo. 16.

Quæ ab extremitate diametri cuiusque circuli ad angulos rectos ducitur, extra ipsum ciculũ cadet, & in locum inter ipsam rectam lineã & peripheriã cõprehẽsum, altera recta linea nõ cadet. Et semicirculi quidem angulus quouis angulo acuto rectilineo maior est, reliquus autem minor.

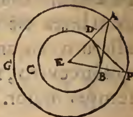


ιζ

Ἀπὸ τοῦ δοθέντος σημείου, τοῦ δοθέντος κύκλου ἐφαπτομένην εὐθεῖαν γραμμὴν ἀγαγεῖν.

Proble.2.Propo.17.

A dato puncto rectam lineam ducere, quæ datum tangat circulum.

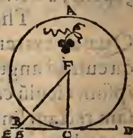


ιη

Ἐὰν κύκλου ἐφάπτηταί τις εὐθεῖα, ἀπὸ δὲ τοῦ κέντρου ἐπὶ τὴν ἁφὴν ἐπιζευχθῇ τις εὐθεῖα, ἡ ἐπιζευχθεῖσα κάθετος ἔσται ἐπὶ τὴν ἀπτομένην.

Theorema 16.Propo.18.

Si circulũ tãgat recta quępiam linea, à centro autẽ ad contactum adiũgatur recta quędam linea: quæ adiuncta fuerit ad ipsam cõtingentem perpendicularis erit.



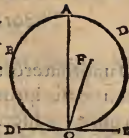
ιθ

Ἐὰν κύκλου ἐφάπτηταί τις εὐθεῖα, ἀπὸ δὲ τῆς ἁφῆς τῇ ἐφαπτομένῃ πρὸς ὀρθὰς γωνίας εὐθεῖα γραμμὴ ἀχθῇ, ἐπὶ τῆς ἀχθείσης ἔσται τὸ κέντρον τοῦ κύκλου.

Theor.17.Propo.19.

Si circulũ tetigerit recta quæpiã linea, à

contactu autē recta linea
ad angulos rectos ipsi tā-
angēti excitetur, in exci-
tata erit centrum circuli.

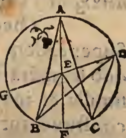


κ

Ἐν κύκλῳ ἡ πρὸς τῷ κέντρῳ γωνία, διπλασίων ἐστὶ τῆς πρὸς τῇ περιφερείᾳ, ὅταν τὴν αὐτὴν περιφέρειαν βάσιν ἔχωσιν αἱ γωνίαι.

Theor.18.Propo.20.

In circulo angulus ad cē-
trū duplex est anguli ad
peripheriam, cùm fue-
rit eadem peripheria ba-
sis angulorum.

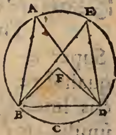


κα

Ἐν κύκλῳ αἱ ἐν τῷ αὐτῷ τμήματι γωνίαι, ἴσαι ἀλλήλαις εἰσίν.

Theor.19.Propo.21.

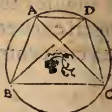
In circulo, qui in eodem
segmento sunt anguli,
sunt inter se æquales.



κβ

Τῶν ἐν τοῖς κύκλοις τετραπλεύρων αἱ ἀπεναντίον γωνίαι, δυσὶν ὀρθαῖς ἴσαι εἰσίν.

Theor.20.Propo.22.



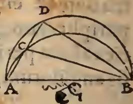
Quadrilaterorum in circulis deſcriptorum anguli qui ex aduerſo, duobus rectis ſunt æquales.

κγ

ἐπὶ τῆς αὐτῆς εὐθείας, δύο τμήματα κύκλων ὅμοια καὶ ἄνισα οὐ συσταθήσονται ἐπὶ τὰ αὐτὰ μέρη.

Theor.21. Propo.23.

Super eadem recta linea, duo ſegmēta circulorum ſimilia & inæqualia non conſtituentur ad eaſdem partes.

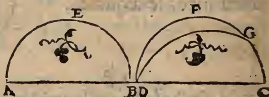


κδ

τὰ ἐπὶ ἴσων εὐθειῶν ὅμοια τμήματα κύκλων, ἴσα ἀλλήλοις εἰσίν.

Theor.22.Propo.24.

Super æqualib⁹ rectis lineis ſimilia circulorum ſegmenta



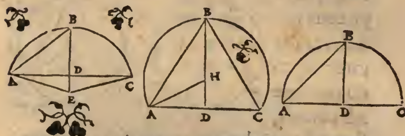
ſunt inter ſe æqualia.

κε

Κύκλου τμήματος δοθέντος, προσαναγράψαι τὸν κύκλον, οὗπερ ἐστὶ τμῆμα.

Probl.3.Propo.25.

Circuli ſegmento dato, deſcribere circulum, cuius eſt ſegmentum.

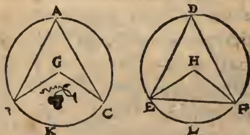


κϛ

Ἐν τοῖς ἴσοις κύκλοις αἱ ἴσαι γωνίαι, ἐπὶ ἴσων περιφερειῶν βεβήκασι, ἐάν τε πρὸς τοῖς κέντροις, ἐάν τε πρὸς ταῖς περιφερείαις ὦσι βεβηκυῖαι.

Theor.23.Propo.26.

In æqualibus circulis, æquales anguli æqualibus peripheriis inſiſtũt ſiue ad cẽtra, ſiue ad peripherias conſtituti inſiſtant.

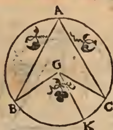


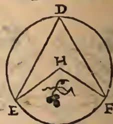
κζ

Ἐν τοῖς ἴσοις κύκλοις, αἱ ἐπὶ ἴσων περιφερειῶν βεβηκυῖαι γωνίαι, ἴσαι ἀλλήλαις εἰσίν, ἐάν τε πρὸς τοῖς κέντροις, ἐάν τε πρὸς ταῖς περιφερείαις ὦσι βεβηκυῖαι.

Theor.24.Propo.27.

In æqualibus circulis, anguli qui æqualibus peripheriis insistũt, sunt inter se æquales siue ad centra, siue ad peripherias constituti insistant.



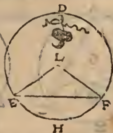


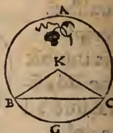
κη

Ἐν τοῖς ἴσοις κύκλοις αἱ ἴσαι εὐθεῖαι ἴσας περιφερείας ἀφαιροῦσι, τὴν μὲν μείζονα, τῇ μείζονι, τὴν δὲ ἐλάττονα, τῇ ἐλάττονι.

Theor.25.Propo.28.

In æqualibus circulis æquales rectę lineę æquales peripherias auferunt, maiorẽ quidẽ, maiori, minorem autem, minori.





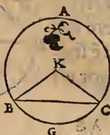
Ἐν

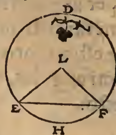
κθ

Ἐν τοῖς ἴσοις κύκλοις ὑπὸ τὰς ἴσας περιφερείας ἴσαι εὐθεῖαι ὑποτείνουσιν.

Theor.26.Propo.29.

In æqualibus circulis, æquales peripherias æquales rectæ lineæ ſubtendunt.



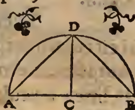


λ

Τὴν δοθεῖσαν περιφέρειαν δίχα τέμνειν.

Problema 4.Propo.30.

Datam peripheriam bifariam ſecare.



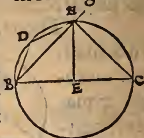
λα

Ἐν κύκλῳ, ἡ μὲν ἐν τῷ ἡμικυκλίῳ γωνία ὀρθή ἐστιν, ἡ δὲ ἐν τῷ μείζονι τμήματι, ἐλάττων ὀρθῆς, ἡ δὲ ἐν τῷ ἐλάττονι, μείζων ὀρθῆς: καὶ ἔτι ἡ μὲν τοῦ μείζονος τμήματος γωνία, μείζων ἐστὶν ὀρθῆς, ἡ δὲ τοῦ ἐλάττονος τμήματος γωνία, ἐλάττων ἐστὶν ὀρθῆς.

Theor.27.Propo.31.

In circulo angulus qui in ſemicirculo,re

ctus est: qui autem in maiore segmento, minor recto: qui verò in minore segmento, maior est recto. Et insuper angulus maioris segmēti, recto quidem maior est: minoris autē segmēti angulus, minor est recto.

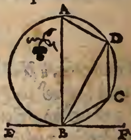


λβ

Ἐὰν κύκλου ἐφάπτηταί τις εὐθεῖα, ἀπὸ δὲ τῆς ἀφῆς εἰς τὸν κύκλον διαχθῇ τις εὐθεῖα τέμνουσα τὸν κύκλον: ἃς ποιεῖ γωνίας πρὸς τῇ ἐφαπτομένῃ, ἴσαι ἔσονται ταῖς ἐν τοῖς ἐναλλὰξ τοῦ κύκλου τμήμασι γωνίαις.

Theor.28.Propo.32.

Si circulum tetigerit aliqua recta linea, à contactu autem producatur quædam recta linea circulum secās: anguli quos ad contingētē facit, æquales sunt iis qui in alternis circuli segmentis consistunt, angulis.



λγ

Ἐπὶ τῆς δοθείσης εὐθείας γράψαι τμῆμα κύκλου δεχόμενον γωνίαν ἴσην τῇ δοθείσῃ γωνίᾳ εὐθυγράμμῳ.

Probl.5.Propo.33.

Super data recta linea describere segmentum circuli quod capiat angulum æqualem dato angulo rectilineo.

λδ

Ἀπὸ τοῦ δοθέντος κύκλου τμῆμα ἀφελεῖν δεχόμενον γωνίαν ἴσην τῇ δοθείσῃ γωνίᾳ εὐθυγράμμῳ.

Probl.6.Propo.34.

A dato circulo segmentum abscindere capiens angulum æqualem dato angulo rectilineo.

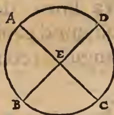
λε

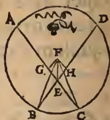
Ἐὰν ἐν κύκλῳ δύο εὐθεῖαι τέμνωσιν ἀλλήλας, τὸ ὑπὸ τῶν τῆς μιᾶς τμημάτων περιεχόμενον ὀρθογώνιον, ἴσον ἐστὶ τῷ ὑπὸ τῶν τῆς ἑτέρας τμημάτων περιεχομένῳ ὀρθογωνίῳ.

Theor.29.Propo.35.

Si in circulo duæ rectæ lineæ sese mutuò

ſecuerint, rectangulum comprehenſum ſub ſegmẽtis vnius, æquale eſt ei, quod ſub ſegmẽtis alterius comprehenditur, rectangulo.



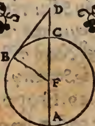


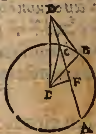
λϛ

Ἐὰν κύκλου ληφθῇ τι σημεῖον ἐκτὸς, καὶ ἀπ' αὐτοῦ
πρὸς τὸν κύκλον προσπίπτωσι δύο εὐθεῖαι, καὶ ἡ μὲν
αὐτῶν τέμνῃ τὸν κύκλον, ἡ δὲ ἐφάπτηται: ἔσται τὸ
ὑπὸ ὅλης τῆς τεμνούσης καὶ τῆς ἐκτὸς ἀπολαμβανομέ
νης μεταξὺ τοῦ τε σημείου καὶ τῆς κυρτῆς περιφερείας,
περιεχόμενον ὀρθογώνιον, ἴσον τῷ ἀπὸ τῆς ἐφα-
πτομένης τετραγώνῳ.

Theor.30.Propo.36.

Si extra circulum ſumatur punctum aliquod, ab eóque in circulum cadant duæ rectæ lineæ, quarum altera quidem circulum ſecet, altera verò tangat: quod ſub tota ſecante & exterius inter punctum & cõuexam peripheriam aſſumpta cõprehen





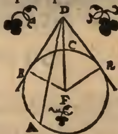
ditur rectangulum, ęquale erit ei, quod à tangente deſcribitur, quadrato.

λζ

Ἐὰν κύκλου ληφθῇ τι σημεῖον ἐκτὸς, ἀπὸ δὲ τοῦ σημείου πρὸς τὸν κύκλον προσπίπτωσι δύο εὐθεῖαι, καὶ ἡ μὲν αὐτῶν τέμνῃ τὸν κύκλον, ἡ δὲ προσπίπτῃ, ᾖ δὲ τὸ ὑπὸ τῆς ὅλης τεμνούσης, καὶ τῆς ἐκτὸς ἀπολαμβανομένης μεταξὺ τοῦ τε σημείου καὶ τῆς κυρτῆς περιφερείας, ἴσον τῷ ἀπὸ τῆς προσπιπτούσης. ἡ προσπίπτουσα ἐφάψεται τοῦ κύκλου.

Theor. 31. Propo. 37.

Si extra circulum ſumatur punctum aliquod, ab eóque puncto in circulum cadant duæ rectæ lineæ, quarum altera circulum ſecet, altera in eum incidat, ſit autem quod ſub tota ſecāte & exterius inter punctum & conuexam peripheriam aſſumpta, comprehenditur rectangulum, æquale ei, quod ab incidente deſcribitur quadrato: incidens ipſa circulum tāget.



Elementi tertii finis.

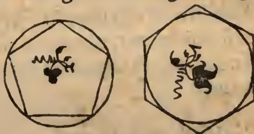
inſcribitur, tangunt.

β

Σχῆμα δὲ ὁμοίως περὶ σχῆμα περιγράφεσθαι λέγεται, ὅταν ἑκάστη πλευρὰ τοῦ περιγραφομένου, ἑκάστης γωνίας τοῦ περὶ ὃ περιγράφεται, ἅπτηται.

2

Similiter & figura circum figurã deſcribi dicitur, quum ſingula eius quæ circunſcribitur, latera ſingulos eius figuræ angulos tetigerint, circũ quàm illa deſcribitur.



γ

Σχῆμα δὲ εὐθύγραμμον εἰς κύκλον ἐγγράφεσθαι λέγεται, ὅταν ἑκάστη γωνία τοῦ ἐγγραφομένου ἅπτηται τῆς τοῦ κύκλου περιφερείας.

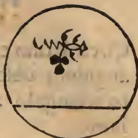
3

Figura rectilinea in circulo inſcribi dicitur, quũ ſinguli eius figuræ quæ inſcribitur, anguli tetigerint circuli peripheriam.

δ

Σχῆμα δὲ εὐθύγραμμον περὶ κύκλον περιγράφεσθαι λέγεται, ὅταν ἑκάστη πλευρὰ τῆς τοῦ κύκλου περιφερείας, τοῦ περιγραφομένου ἐφάπτηται.

coaptari dicitur, quũ eius extrema in circuli peripheria fuerint.



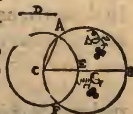
Προτάσεις.

α

Εἰς τὸν δοθέντα κύκλον τῇ δοθείσῃ εὐθείᾳ μὴ μείζονι οὔσῃ τῆς τοῦ κύκλου διαμέτρου, ἴσην εὐθεῖαν ἐναρμόσαι.

Probl.1. Propo.1.

In dato circulo, rectam lineam accommodare æqualem datæ rectæ lineæ, quæ circuli diametro nõ ſit maior.

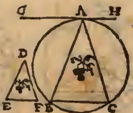


β

Εἰς τὸν δοθέντα κύκλον, τῷ δοθέντι τριγώνῳ ἰσογώνιον τρίγωνον ἐγγράψαι.

Proble.2. Propo.2.

In dato circulo, triangulum deſcribere dato triãgulo æquiangulum.

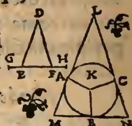


γ

Περὶ τὸν δοθέντα κύκλον, τῷ δοθέντι τριγώνῳ ἰσογώνιον τρίγωνον περιγράψαι.

Probl.3.Proop.3.

Circa datum circulum triangulum describere dato triangulo æquiangulum.

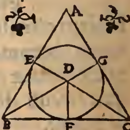


δ

Εἰς τὸ δοθὲν τρίγωνον, κύκλον ἐγγράψαι.

Probl.4. Propo.4.

In dato triangulo circulum inscribere.

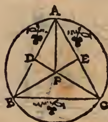


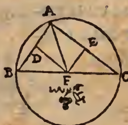
ε

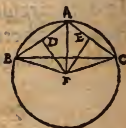
Περὶ τὸ δοθὲν τρίγωνον, κύκλον περιγράψαι.

Probl..5.Propo.5.

Circa datum triangulum, circulum describere.





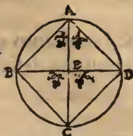


ς

Εἰς τὸν δοθέντα κύκλον, τετράγωνον ἐγγράψαι.

Probl.6.Propo.6.

In dato circulo quadratũ describere.

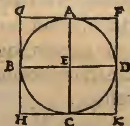


ζ

περὶ τὸν δοθέντα κύκλον, τετράγωνον περιγράψαι.

Probl.7.Propo.7.

Circa datum circulum, quadratum describere.

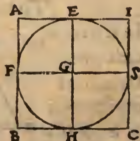


η

Εἰς τὸ δοθὲν τετράγωνον, κύκλον ἐγγράψαι.

Probl.8.Propo.8.

In dato quadrato circulum inscribere.

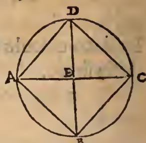


θ

περὶ τὸ δοθὲν τετράγωνον, κύκλον περιγράψαι.

Probl.9. Propo.9.

Circa datum quadratũ, circulum deſcribere.

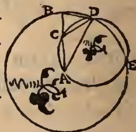


ι

Ἰσοσκελὲς τρίγωνον συστήσασθαι, ἔχον ἑκατέραν τῶν πρὸς τῇ βάσει γωνιῶν, διπλασίονα τῆς λοιπῆς.

Probl.10. Propo.10.

Iſoſceles triangulũ cõſtituere, quod habeat vtrũque eorum, qui ad baſin ſunt, angulorum, duplum reliqui.

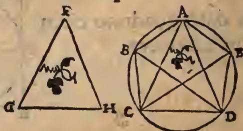


ια

Εἰς τὸν δοθέντα κύκλον, πεντάγωνον ἰσόπλευρόν τε καὶ ἰσογώνιον ἐγγράψαι.

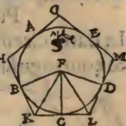
Theor.11. Propo.11.

In dato circulo, pentagωnum ęquilaterũ & æquiangulum inſcribere.



Περι τον δοθεντα κυκλον, πενταγωνον ισοπλευρον τε και ισογωνιον περιγραψαι.

Proble.12.Propo.12.

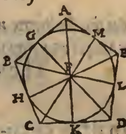


Circa datum circulum, pentagωnum æquilaterū & æquiangulum deſcribere.

ιγ

Εις το δοθεν πενταγωνον, ο εστιν ισοπλευρον τε και ισογωνιον, κυκλον εγγραψαι.

Proble.13.Propo.13.



In dato pentagωno æquilatero & æquiangulo, circulum inſcribere.

ιδ

Περι το δοθεν πενταγωνον, ο εστιν ισοπλευρον τε και ισογωνιον, κυκλον περιγραψαι.

Probl.14.Propo.14.



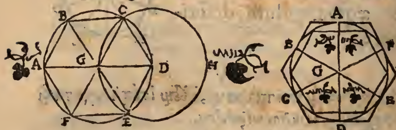
Circa datum pentagωnū ęquilaterum & æquiangulum, circulū deſcribere.

ιε

Εἰς τὸν δοθέντα κύκλον, ἑξάγωνον ἰσόπλευρόν τε καὶ ἰσογώνιον ἐγγράψαι.

Probl.15.Propo.15.

In dato circulo hexagonũ & æquilaterũ & ęquiangulum inſcribere.



ιϛ

Εἰς τὸν δοθέντα κύκλον πεντεκαιδεκάγωνον ἰσόπλευρόν τε καὶ ἰσογώνιον ἐγγράψαι.

Theor.16.Propo.16.

In dato circulo quintideca gωnũ & ęquilaterum & æquiangulum deſcribere.



Elementi quarti finis.



ΕΥΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙΟΝ ΠΕΜΠΤΟΝ.

EVCLIDIS ELEMENTVM QVINTVM.

ὅροι.

α

Μέρος ἐστὶ μέγεθος μεγέθους, τὸ ἔλασσον τοῦ μείζονος, ὅταν καταμετρῇ τὸ μεῖζον.

DEFINITIONES.

1

Pars est magnitudo magnitudinis minor maioris, quũ minor metitur maiorẽ.

β

Πολλαπλάσιον δὲ, τὸ μεῖζον τοῦ ἐλάσσονος, ὅταν καταμετρῆται ὑπὸ τοῦ ἐλάττονος.

2

Multiplex autẽ est maior minoris, cùm minor metitur maiorem.

γ

Λόγος ἐστὶ δύο μεγεθῶν ὁμογενῶν ἡ κατὰ πηλικό-

τητα πρὸς ἄλληλα ποιὰ σχέσις.

3

Ratio, est duarum magnitudinum eiusdem generis mutua quædam, secundum quantitatem habitudo.

δ

Ἀναλογία δέ ἐστιν, ἡ τῶν λόγων ὁμοιότης.

4

Proportio verò, est rationũ similitudo.

ε

Λόγον ἔχειν πρὸς ἄλληλα μεγέθη λέγεται, ἃ δύναται πολλαπλασιαζόμενα ἀλλήλων ὑπερέχειν.

5

Rationem habere inter se magnitudinis dicuntur, quæ possunt multiplicatæ sese mutuò superare.

ϛ

Ἐν τῷ αὐτῷ λόγῳ μεγέθη λέγεται εἶναι, πρῶτον πρὸς δεύτερον, καὶ τρίτον πρὸς τέταρτον, ὅταν τὰ τοῦ πρώτου καὶ τρίτου ἰσάκις πολλαπλάσια, τῶν τοῦ δευτέρου καὶ τετάρτου ἰσάκις πολλαπλασίων καθ' ὁποιονοῦν πολλαπλασιασμόν, ἑκάτερον ἑκατέρου ἢ ἅμα ἐλλείπῃ, ἢ ἅμα ἴσα ᾖ, ἢ ἅμα ὑπερέχῃ ληφθέντα κατάλληλα.

6

In eadem ratione magnitudines dicuntur esse, prima ad secundam, & tertia ad quartam,

quartã:cùm primę & tertiæ ęquè multiplicia à secũdę& quartæ ęquè multiplicibus, qualiscunque sit hæc multiplicatio, vtrunque ab vtroque, vel vnà deficiunt, vel vnà æqualia sunt, vel vnà excedunt, si ea sumantur quę inter se respondent.

τὰ δὲ τὸν αὐτὸν ἔχοντα μεγέθη λόγον, ἀνάλογον καλείσθω.

7

Eandem autem habentes rationem magnitudines, proportionales vocentur.

η

ὅταν δὲ τῶν ἰσάκις πολλαπλασίων, τὸ μὲν τοῦ πρώτου πολλαπλάσιον ὑπερέχῃ τοῦ τοῦ δευτέρου πολλαπλασίου, τὸ δὲ τοῦ τρίτου πολλαπλάσιον, μὴ ὑπερέχῃ τοῦ τοῦ τετάρτου πολλαπλασίου, τότε πρῶτον πρὸς τὸ δεύτερον μείζονα λόγον ἔχειν λέγεται, ἤπερ τὸ τρίτον πρὸς τὸ τέταρτον.

8

Cùm verò æquè multipliciũ, multiplex primæ magnitudinis excesserit multiplicem secundæ, at multiplex tertiæ non excesserit multiplicem quartæ: tunc prima ad secundam maiorem rationem habere dicetur, quàm tertia ad quartam.

θ

Ἀναλογία δὲ ἐν τρισὶν ὅροις ἐλαχίστοις ἐστίν.

9

Proportio autem in tribus terminis paucissimis consistit.

ι

ὅταν δὲ τρία μεγέθη ἀνάλογον ᾖ, τὸ πρῶτον πρὸς τὸ τρίτον, διπλασίονα λόγον ἔχειν λέγεται, ἤπερ πρὸς τὸ δεύτερον. ὅταν δὲ τέσσαρα μεγέθη ἀνάλογομ ᾖ, τὸ πρῶτον πρὸς τὸ τέταρτον, τριπλασίονα λόγομ ἔχειμ λέγεται, ἤπερ πρὸς τὸ δεύτερον, καὶ ἀεὶ ἑξῆς ἑνὶ πλεῖομ, ἕως ἂν ἡ ἀναλογία ὑπάρχῃ.

10

Cùm autem tres magnitudines proportionales fuerint, prima ad tertiam, duplicatam rationem habere dicitur eius, quam habet ad secundam. At cùm quatuor magnitudines proportionales fuerint, prima ad quartam, triplicatam rationem habere dicitur eius quam habet ad secũdam: & semper deinceps vno amplius, quandiu porportio extiterit.

ια

ὁμόλογα μεγέθη λέγεται εἶναι, τὰ μὲν ἡγούμενα τοῖς ἡγουμένοις, τὰ δὲ ἑπόμενα τοῖς ἑπομένοις.

11

Homologæ, seu similes ratione magnitudines dicuntur, antecedentes quidem antecedentibus, consequentes verò

consequentibus.

ιβ

Ἐναλλὰξ λόγος, ἐστὶν λῆψις τοῦ ἡγουμένου πρὸς τὸ ἡγούμενον, καὶ τοῦ ἑπομένου πρὸς τὸ ἑπόμενον.

12

Alterna ratio, est sumptio ãtecedẽtis cõparati ad antecedentẽ, & consequentis ad consequentem.

ιγ

Ἀνάπαλιν λόγος, ἐστὶ λῆψις τοῦ ἑπομένου ὡς ἡγουμένου, πρὸς τὸ ἡγούμενον ὡς ἑπόμενον.

13

Inuersa ratio, est sumptio consequentis, ceu antecedentis, ad antedentem velut ad consequentem.

ιδ

Σύνθεσις λόγου, ἐστὶ λῆψις τοῦ ἡγουμένου μετὰ τοῦ ἑπομένου ὡς ἑνὸς πρὸς αὐτὸ τὸ ἑπόμενον.

14

Compositio rationis, est sumptio antecedentis cum consequente ceu vnius, ad ipsum consequentem.

ιε

Διαίρεσις δὲ λόγου, ἐστὶ λῆψις τῆς ὑπεροχῆς, ᾗ ὑπερέχει τὸ ἡγούμενον τοῦ ἑπομένου, πρὸς αὐτὸ τὸ ἑπόμενον.

15

Diuisio rationis, est sumptio excessus

quo conſequentem ſuperat antecedẽs ad ipſum conſequentem.

ιε

Ἀναστροφὴ λόγου, ἐστὶ λῆψις τοῦ ἡγουμένου πρὸς τὴν ὑπεροχήν, ᾗ ὑπερέχει τὸ ἡγούμενον τοῦ ἑπομένου.

16

Conuerſio rationis, eſt ſumptio antecedentis ad exceſſum, quo ſuperat antecedens ipſum conſequentem.

ιζ

Δι᾽ ἴσου λόγος ἐστὶ πλειόνων ὄντων μεγεθῶν, καὶ ἄλλων αὐτοῖς ἴσων τὸ πλῆθος σὺν δύο λαμβανομένων καὶ ἐν τῷ αὐτῷ λόγῳ, ὅταν ᾖ ὡς ἐν τοῖς πρώτοις μεγέθεσι, τὸ πρῶτον πρὸς τὸ ἔσχατον, οὕτως ἐν τοῖς δευτέροις μεγέθεσι, τὸ πρῶτον πρὸς τὸ ἔσχατον. ἢ ἄλλως, λῆψις τῶν ἄκρων, καθ᾽ ὑπεξαίρεσιν τῶν μέσων.

17

Ex æqualitate ratio eſt, ſi plures duabus ſint magnitudines, & his aliæ multitudine pares quę binę ſumantur, & in eadem ratione: quum vt in primis magnitudinibus prima ad vltimã, ſic & in ſecundis magnitudinibus prima ad vltimam ſeſe habuerit. vel aliter, ſumptio extremorũ per ſubductionem mediorum.

ιη

Τεταγμένη ἀναλογία ἐστίν, ὅταν ᾖ ὡς ἡγούμενον πρὸς ἑπόμενον, οὕτως ἡγούμενον πρὸς τὸ ἑπόμενον, ᾖ

δὲ ὡς ἑπόμενον πρὸς ἄλλο τι, οὕτως ἑπόμενον πρὸς ἄλλο τι.

18

Ordinata proportio est, cùm fuerit quẽadmodum antecedens ad consequentem, ita antecedens ad consequẽtẽ: fuerit etiam vt consequẽs ad aliud quidpiã, ita consequens ad aliud quidpiam.

ιθ

Τεταραγμένη δὲ ἀναλογία ἐστὶν, ὅταν τριῶν ὄντων μεγεθῶν, καὶ ἄλλων ἴσων αὐτοῖς τὸ πλῆθος γίνεται ὡς μὲν ἐν τοῖς πρώτοις μεγέθεσιν ἡγούμενον πρὸς ἑπόμενον, οὕτως ἐν τοῖς δευτέροις μεγέθεσιν, ἡγούμενον πρὸς ἑπόμενον: ὡς δὲ ἐν τοῖς πρώτοις μεγέθεσιν ἑπόμενον πρὸς ἄλλο τι, οὕτως ἐν τοῖς δευτέροις μεγέθεσιν ἄλλο τι πρὸς ἡγούμενον.

19

Perturbata autem proportio est, tribus positis magnitudinibus, & aliis quæ sint his multitudine pares, cùm vt in primis quidem magnitudinibus se habet antecedens ad consequentem, ita in secundis magnitudinibus antecedens ad consequentem: vt autem in primis magnitudinibus cõsequens ad aliud quidpiam, sic in secundis magnitudinibus aliud quidpiam ad antecedentem.

Προτάσεις.

α

Ἐὰν ᾖ ὁποσαοῦν μεγέθη, ὁποσωνοῦν μεγεθῶν ἴσων τὸ πλῆθος, ἕκαστον ἑκάστου ἰσάκις πολλαπλάσιον, ὁσαπλάσιόν ἐστιν ἓν τῶν μεγεθῶν ἑνός, τοσαυταπλάσια, ἔσται καὶ τὰ πάντα τῶν πάντων.

Theor.1.Propo..1.

Si ſint quotcũque magnitudines quotcũque magnitudinũ æqualium numero, ſingulæ ſingularũ æquè multiplices, quàm multiplex eſt vnius vna magnitudo, tam multiplices erunt & omnes omnium.

β

Ἐὰν πρῶτον δευτέρου ἰσάκις ᾖ πολλαπλάσιον καὶ τρίτον τετάρτου, ᾖ δὲ καὶ πέμπτον δευτέρου ἰσάκις πολλαπλάσιον, καὶ ἕκτον τετάρτου· καὶ συντεθὲν πρῶτον καὶ πέμπτον, δευτέρου ἰσάκις ἔσται πολλαπλάσιον, καὶ τρίτον καὶ ἕκτον τετάρτου.

Theor.2. Propo.2.

Si prima ſecũdę æquè fuerit multiplex, atque tertia quartæ, fuerit autem & quinta ſecũdæ æquè multiplex, atq; ſexta quartę: erit & compoſita prima

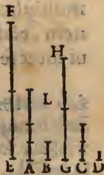
cum quinta, secūdæ æquè multiplex, atque tertia cum, sexta quartæ.

γ

ἐὰν πρῶτον δευτέρου ἰσάκις ᾖ πολλαπλάσιον, καὶ τρίτον τετάρτου, ληφθῇ δὲ ἰσάκις πολλαπλάσια τοῦ πρώτου καὶ τρίτου: καὶ δι' ἴσου, τῶν ληφθέντων ἑκάτερον ἑκατέρου ἰσάκις ἔσται πολλαπλάσιον, τὸ μὲν τοῦ δευτέρου, τὸ δὲ τοῦ τετάρτου.

Theor. 3. Propo. 3.

Si sit prima secundæ æquè multiplex atq; tertia quartæ, sumantur autem æquè multiplices primæ & tertiæ: erit & ex æquo sumptarum vtraque vtriusque æquè multiplex, altera quidem secundæ, altera autē quartæ.

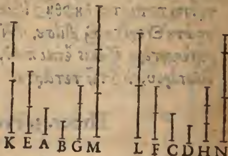


δ

Ἐὰν πρῶτον πρὸς δεύτερον τὸν αὐτὸν ἔχῃ λόγον, καὶ τρίτον πρὸς τέταρτον: καὶ τὰ ἰσάκις πολλαπλάσια τοῦ τε πρώτου καὶ τρίτου, πρὸς τὰ ἰσάκις πολλαπλάσια τοῦ δευτέρου καὶ τετάρτου καθ' ὁποιονοῦν πολλαπλασιασμὸν, τὸν αὐτὸν ἕξει λόγον ληφθέντα κατάλληλα.

Theor. 4. Propo. 4.

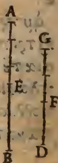
Si prima ad ſecundam, eandem habuerit rationem, & tertia ad quartam: etiam æquè multiplices primæ & tertiæ, ad æquè multiplices ſecundæ & quartæ iuxta quanuis multiplicationem, eādem habebunt rationem, ſi prout inter ſe reſpōdent, ita ſumptæ fuerint.



Ἐὰν μέγεθος μεγέθους ἰσάκις ᾖ πολλαπλάσιον, ὅπερ ἀφαιρεθὲν ἀφαιρεθέντος, καὶ τὸ λοιπὸν τοῦ λοιποῦ ἰσάκις ἔσται πολλαπλάσιον, ὁσαπλάσιόν ἐστι τὸ ὅλον τοῦ ὅλου.

Theor. 5. Propo. 5.

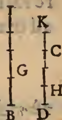
Si magnitudo magnitudinis æquè fuerit multiplex, atque ablata ablatæ: etiam reliqua reliquę ita multiplex erit, vt tota totius.



ε

Ἐὰμ δύο μεγέθη, δύο μεγεθῶμ ἰσάκις ᾖ πολλαπλάσια, καὶ ἀφαιρεθέντα τινὰ τῶν αὐτῶν ἰσάκις ᾖ πολλαπλάσια: καὶ τὰ λοιπὰ τοῖς αὐτοῖς ἤτοι ἴσα ἐστὶμ, ἢ ἰσάκις αὐτῶν πολλαπλάσια.

Theor.6.Propo.6.

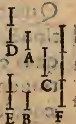


Si duę magnitudines, duarum magnitudinum sint æquè multiplices, & detractæ quędã sint earundẽ æquè multiplices: & reliquæ eisdẽ aut ęquales sunt, aut æquè ipsarum multiplices.

ζ

Τὰ ἴσα πρὸς τὸ αὐτὸ τὸν αὐτὸμ ἔχει λόγομ: καὶ τὸ αὐτὸ πρὸς τὰ ἴσα.

Theor.7.Propo.7.



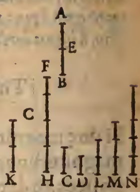
Æquales ad eandem, eandem habent rationem: & eadem ad æquales.

η

Τῶμ ἀνίσωμ μεγεθῶμ, τὸ μεῖζομ πρὸς τὸ αὐτὸ μείζονα λόγομ ἔχει, ἤπερ τὸ ἔλαττομ: καὶ τὸ αὐτὸ πρὸς τὸ ἔλαττομ μείζονα λόγομ ἔχει, ἤπερ πρὸς τὸ μεῖζομ.

Theor.8.Propo.8.

Inæqualium magnitudinum, maior ad eandem maiorem rationem habet, quàm minor: & eadem ad minorem, maiorē rationē habet, quàm ad maiorem.

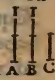


θ

τὰ πρὸς τὸ αὐτὸ τὸν αὐτὸν ἔχοντα λόγον, ἴσα ἀλλήλοις ἐστί· καὶ πρὸς ἃ τὸ αὐτὸ τὸν αὐτὸν ἔχει λόγον, κἀκεῖνα ἴσα ἀλλήλοις ἐστίν.

Theor.9.Propo.9.

Quæ ad eandem, eandem habent rationē, æquales sunt inter se: & ad quas eadem, eandem habet rationem, eæ quoque sunt inter se æquales.



ι

Τῶν πρὸς τὸ αὐτὸ λόγον ἐχόντων, τὸ τὸν μείζονα λόγον ἔχον, ἐκεῖνο μεῖζόν ἐστι. πρὸς ὃ δὲ τὸ αὐτὸ μείζονα λόγον ἔχει, ἐκεῖνο ἔλαττόν ἐστιν.

Theor.10.Propo.10.

Ad eandem magnitudinem, rationẽ habentiũ, quæ maiorem rationem habet, illa maior est. ad quàm autem eadem maiorem rationẽ habet, illa minor est.

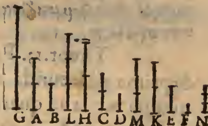


ια

οἱ τῷ αὐτῷ λόγοι οἱ αὐτοί, καὶ ἀλλήλοις εἰσὶν οἱ αὐτοί.

Theor.11.Propo.11.

Quę eidẽ sunt eędẽ rationes, & inter se sunt eędem.

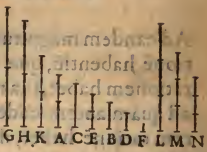


ιβ

Ἐὰν ᾖ ὁποσαοῦν μεγέθη ἀνάλογον, ἔσαι ὡς ἓν τῶν ἡγουμένων πρὸς ἓν τῶν ἑπομένων, οὕτως ἅπαντα τὰ ἡγούμενα, πρὸς ἅπαντα τὰ ἑπόμενα.

Theor.12. Propo.12.

Si ſint magnitudines quotcũque proportionales, quẽadmodũ ſe habuerit vna antecedẽtium ad vnam conſequentium, ita ſe habebunt omnes antecedẽes ad omnes conſequẽtes.



ιγ

Ἐὰν πρῶτον πρὸς δεύτερον τὸν αὐτὸν ἔχῃ λόγον, καὶ τρίτον πρὸς τέταρτον, τρίτον δὲ πρὸς τέταρτον μείζονα λόγον ἔχῃ, ἢ πέμπτον πρὸς ἕκτον· καὶ πρῶτον πρὸς δεύτερον μείζονα λόγον ἕξει, ἢ πέμπτον πρὸς ἕκτον.

Theor.13. Propo.13.

Si prima ad ſecundã, eãdẽ habuerit rationẽ, quã tertia ad quartam, tertia verò ad quartã, maiorẽ rationẽ habuerit, quã quinta ad ſextam; prima quoque ad ſecundã maiorẽ rationẽ habebit, quã quinta ad ſextã.



ιδ

Ἐὰν πρῶτον πρὸς δεύτερον τὸν αὐτὸν ἔχῃ λόγον, καὶ τρίτον πρὸς τέταρτον, τὸ δὲ πρῶτον τοῦ τρίτου μεῖζον ᾖ: καὶ τὸ δεύτερον τοῦ τετάρτου μεῖζον ἔσται, κἂν ἔλασσον, ἔλασσον.

Theor.14.Propo. 14.

Si prima ad ſecundam eandem habuerit rationem, quam tertia ad quartam, prima verò quàm tertia maior fuerit: erit & ſecunda maior quàm quarta. Quòd ſi prima fuerit æqualis tertiæ, erit & ſecunda æqualis quartæ: ſi verò minor, & minor erit.

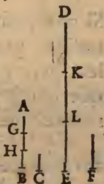


ιε

Τὰ μέρη, τοῖς ὡσαύτως πολλαπλασίοις τὸν αὐτὸν ἔχει λόγον, ληφθέντα καταλληλα.

Theor.15.Propo.15.

Partes, cum pariter multiplicibus in eadem ſunt ratione, ſi prout ſibi mutuo reſpondent, ita ſumantur.

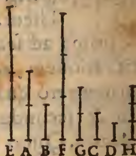


ιε

Ἐὰν τέσσαρα μεγέθη ἀνάλογον ᾖ, καὶ ἐναλλὰξ ἀνάλογον ἔσται.

Theor.16.Propo.16.

Si quatuor magnitudines proportionales fuerint, & vicissim proportionales erunt.

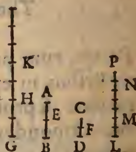


ιζ

Ἐὰν συγκείμενα μεγέθη ἀνάλογον ᾖ, καὶ διαιρεθέντα, ἀνάλογον ἔσται.

Theor.17. Propo. 17.

Si compositæ magnitudines proportionales fuerint, hæ quoque diuisæ proportionales erunt.

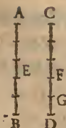


ιη

Ἐὰν διῃρημένα μεγέθη ἀνάλογον ᾖ, καὶ συντεθέντα ἀνάλογον ἔσται.

Theor.18.Propo.18.

Si diuisæ magnitudines sint proportionales, hæ quoque compositæ proportionales erunt.

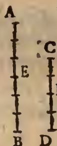


ιθ

Ἐὰν ᾖ ὡς ὅλον πρὸς ὅλον, οὕτως ἀφαιρεθὲν πρὸς ἀφαιρεθέν: καὶ τὸ λοιπὸν πρὸς τὸ λοιπὸν ἔσται, ὡς ὅλον πρὸς ὅλον.

Theor.19.Propo.19.

Si quemadmodum totum ad totum, ita ablatum se habuerit ad ablatum: & reliquum ad reliquum, vt totum ad totum se habebit.

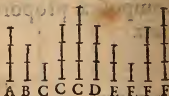


κ

Ἐὰν ᾖ τρία μεγέθη, καὶ ἄλλα αὐτοῖς ἴσα τὸ πλῆθος, σύνδυο λαμβανόμενα, καὶ ἐν τῷ αὐτῷ λόγῳ, διίσου δὲ τὸ πρῶτον τοῦ τρίτου μεῖζον ᾖ: καὶ τὸ τέταρτον τοῦ ἕκτου μεῖζον ἔσται: κἂν ἴσον, ἴσον: κἂν ἔλαττον ἔλαττον.

Theor.20.Propo.20.

Si ſint tres magnitudines, & aliæ ipſis æquales numero, quæ binæ & in eadem ratione ſumãtur, ex æquo autẽ prima quàm tertiá maior fuerit: erit & quarta, quàm ſexta maior. Quòd ſi prima tertiæ fuerit æqualis, erit & quarta æqualis ſextę: ſin illa minor, hęc quoque minor erit.

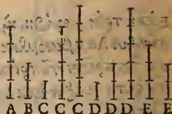


κα

Ἐὰν ᾖ τρία μεγέθη, καὶ ἄλλα αὐτοῖς ἴσα τὸ πλῆθος σύνδυο λαμβανόμενα, ἐν τῷ αὐτῷ λόγῳ, ᾖ δὲ τεταραγμένη αὐτῶν ἡ ἀναλογία, δι᾽ ἴσου δὲ τὸ πρῶτον τοῦ τρίτου μεῖζον ᾖ: καὶ τὸ τέταρτον τοῦ ἕκτου μεῖζον ἔσται: κἂν ἴσον, ἴσον: κἂν ἔλασσον, ἔλασσον.

Theor.21.Propo.21.

Si ſint tres magnitudines, & aliæ ipſis, æquales numero quæ binæ: & in eadẽ ratiõe ſumãtur, fueritque per-



turbata earum proportio, ex æquo autẽ prima quàm tertia maior fuerit, erit & quarta quàm ſexta maior. quòd ſi prima tertiæ fuerit æqualis, etit & quarta æqualis ſextæ: ſin illa minor, hæc quoque minor erit.

κβ

Ἐὰν ᾖ ὁποσαοῦν μεγέθη, καὶ ἄλλα αὐτοῖς ἴσα τὸ πλῆθος, σύνδυο λαμβανόμενα ἐν τῷ αὐτῷ λόγῳ, καὶ δι᾽ ἴσου ἐν τῷ αὐτῷ λόγῳ ἔσται.

Theor.22. Propo.22.

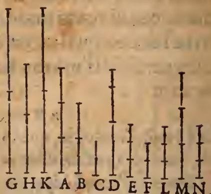
Si ſint quotcũque magnitudines, & aliæ ipſis æquales numero, quæ binæ in eadẽ ratione ſumãtur, & ex æqualitate in eadem ratione erunt.



αγ

Ἐὰν ᾖ τρία μεγέθη, καὶ ἄλλα αὐτοῖς ἴσα τὸ πλῆθος σύνδυο λαμβανόμενα ἐν τῷ αὐτῷ λόγῳ, ᾖ δὲ τεταραγμένη αὐτῶν ἡ ἀναλογία, καὶ δι᾽ ἴσου ἐν τῷ αὐτῷ λόγῳ ἔσται.

Theor.23.Propo.23.

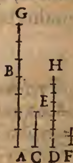


Si ſint tres magnitudines, aliæque ipſis æquales numero, quę binæ in eadem ratione ſumantur, fuerit autem perturbata earum proportio: etiam ex æqualitate in eadem ratione erunt.

κδ

Ἐὰν πρῶτον πρὸς δεύτερον τὸν αὐτὸν ἔχῃ λόγον καὶ τρίτον πρὸς τέταρτον, ἔχῃ δὲ καὶ πέμπτον πρὸς δεύτερον τὸν αὐτὸν λόγον, καὶ ἕκτον πρὸς τέταρτον: καὶ συντεθὲν πρῶτον καὶ πέμπτον πρὸς δεύτερον τὸν αὐτὸν ἕξει λόγον, καὶ τρίτον καὶ ἕκτον πρὸς τέταρτον.

Theor.24.Propo.24.



Si prima ad ſecundam, eandem habuerit rationem, quã tertia ad quartam, habuerit autem & quinta ad ſecundã eandem rationẽ, quam ſexta ad quartam: etiam cõpoſita prima cum quinta ad ſe-

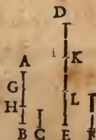
cundam eandem habebit rationem,quã tertia cum ſexta ad quartam.

κε

Ἐὰν τέσσαρα μεγέθη ἀνάλογον ᾖ, τὸ μέγιστον καὶ τὸ ἐλάχιστον, δύο τῶν λοιπῶν μείζονά ἐστιν.

Theor.25.Propo.25.

Si quatuor magnitudines proportionales fuerint, maxima & minima reliquis duabus maiores erũt.



Elementi quinti finis.



ΕὐΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ἝΚΤΟΝ.

EVCLIDIS ELEMENTVM SEXTVM.

ὍΡΟΙ.

α.

Ὅμοια σχήματα εὐθύγραμμά ἐστιν, ὅσα τάς τε γωνίας ἴσας ἔχει κατὰ μίαν καὶ τὰς περὶ τὰς ἴσας γωνίας πλευρὰς ἀνάλογον.

DEFINITIONES.

I

Similes figuræ rectilineæ, ſunt quæ & angulos ſingulos ſingulis æquales habẽt, atque etiam latera, quæ circum angulos æquales, proportionalia.

β

Ἀντιπεπονθότα δὲ σχήματά ἐστιν, ὅταν ἑκατέρῳ τῶν σχημάτων ἡγούμενοί τε καὶ ἑπόμενοι λόγοι ὦσιν.

2

Reriprocæ autem figuræ ſunt, cùm in vtraque figura antecedentes & conſequentes rationum termini fuerint.

γ

Ἄκρον καὶ μέσον λόγον εὐθεῖα τετμῆσθαι λέγεται, ὅταν ᾖ ὡς ἡ ὅλη πρὸς τὸ μεῖζον τμῆμα, οὕτως τὸ μεῖζον πρὸς τὸ ἔλασσον.

3

Secundum extremam & mediam rationem recta linea ſecta eſſe dicitur, cùm vt tota ad maius ſegmentum, ita maius ad minus ſe habuerit.

δ

Ὕψος ἐστὶ παντὸς σχήματος, ἡ ἀπὸ τῆς κορυφῆς ἐπὶ τὴν βάσιν κάθετος ἀγομένη.

4

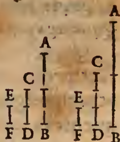
Altitudo cuiuſque figuræ, eſt linea perpẽdicularis à vertice ad baſin deducta.

ε

Λόγος ἐκ λόγων συγκεῖσθαι λέγεται, ὅταν αἱ τῶν λόγων πηλικότητες ἐφ' ἑαυτὰς πολλαπλασιασθεῖσαι ποιῶσί τινα λόγον.

5

Ratio ex rationibus cõponi dicitur, cùm rationũ quantitates inter se multiplicatæ aliquam ef fecerint rationem.



Προτάσεις.

α

Τὰ τρίγωνα καὶ τὰ παραλληλόγραμμα, τὰ ὑπὸ τὸ αὐτὸ ὕψος ὄντα, πρὸς ἄλληλά ἐστιν ὡς αἱ βάσεις.

Theor.1. Propo.1.

Triangula & parallelogramma, quorum eadem fuerit altitudo, ita se habent inter se vt bases.



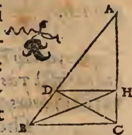
β

Ἐὰν τριγώνου παρὰ μίαν τῶν πλευρῶν ἀχθῇ τις εὐθεῖα παράλληλος, ἀνάλογον τεμεῖ τὰς τοῦ τριγώνου πλευράς. καὶ ἐὰν αἱ τοῦ τριγώνου πλευραὶ ἀνάλογον τμηθῶσιν, ἡ ἐπὶ τὰς τομὰς ἐπιζευγνυμένη εὐθεῖα, παρὰ τὴν λοιπὴν ἔσται τοῦ τριγώνου πλευρὰν παράλληλος.

Theor.2. Propo.2.

Si ad vnum trianguli latus parallela du-

cta fuerit recta quædam linea: hæc proportionaliter secabit ipsius trianguli latera. Et si trianguli latera proportionaliter secta fuerint: quæ ad sectiones adiuncta fuerit recta linea, erit ad reliquum ipsius trianguli latus parallela.

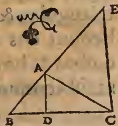


γ

Ἐὰν τριγώνου γωνία δίχα τμηθῇ, ἡ δὲ τέμνουσα τὴν γωνίαν εὐθεῖα τέμνῃ καὶ τὴν βάσιν, τὰ τῆς βάσεως τμήματα τὸμ αὐτὸν ἕξει λόγομ ταῖς λοιπαῖς τοῦ τριγώνου πλευραῖς. καὶ ἐὰμ τὰ τῆς βάσεως τμήματα, τὸμ αὐτὸν ἔχῃ λόγομ ταῖς λοιπαῖς τοῦ τριγώνου πλευραῖς, ἡ ἀπὸ τῆς κορυφῆς ἐπὶ τὴν τομὴν ἐπιζευγνυμένη εὐθεῖα δίχα τέμνει τὴν τοῦ τριγώνου γωνίαμ.

Theor.3. Propo.3.

Si trianguli angulus bifariam sectus sit, secans autem angulum recta linea secuerit & basim: basis segmenta eandem habebunt rationem, quam reliqua ipsius trianguli latera. Et si basis segmenta eandem habeant rationem quam reliqua ipsius trianguli latera, recta li-



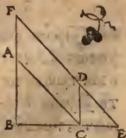
nea, quæ à vertice ad sectionem producitur, ea bifariam secat trianguli ipsius angulum.

δ

Τῶν ἰσογωνίων τριγώνων, ἀνάλογόν εἰσιν αἱ πλευραὶ αἱ περὶ τὰς ἴσας γωνίας, καὶ ὁμόλογοι αἱ ὑπὸ τὰς ἴσας γωνίας ὑποτείνουσαι πλευραί.

Theor. 4. Propo. 4.

Æquiangulorum ttiangulorum proportionalia sunt latera, quæ circum æquales angulos, & homologa sunt latera, quæ æqualibus angulis subtenduntur.

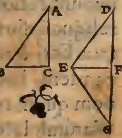


ε

Ἐὰν δύο τρίγωνα τὰς πλευρὰς ἀνάλογον ἔχῃ, ἰσογώνια ἔσται τὰ τρίγωνα, καὶ ἴσας ἕξει τὰς γωνίας ὑφ' ἃς αἱ ὁμόλογοι πλευραὶ ὑποτείνουσιν.

Theor. 5. Propo. 5.

Si duo triãgula latera proportionalia habeant, æquiangula erunt triangula, & æquales habebunt eos angulos, sub quibus & homologa latera subtenduntur.

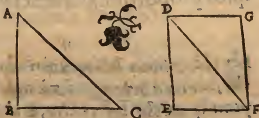


ς

Ἐὰν δύο τρίγωνα μίαν γωνίαν μιᾷ γωνίᾳ ἴσην ἔχῃ, περὶ δὲ τὰς ἴσας γωνίας τὰς πλευρὰς ἀνάλογον, ἰσογώνια ἔσται τὰ τρίγωνα, καὶ ἴσας ἕξει τὰς γωνίας, ὑφ᾽ ἃς αἱ ὁμόλογοι πλευραὶ ὑποτείνουσιν.

Theor.6.Propo.6.

Si duo triangula vnum angulum vni angulo æqualem, & circum æquales angulos latera proportionalia habuerint, æquiangula erunt triangula, æqualésque habebunt angulos, sub quibus homologa latera subtenduntur.



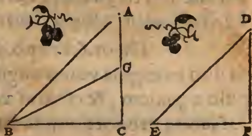
ζ

Ἐὰν δύο τρίγωνα μίαν γωνίαν μιᾷ γωνίᾳ ἴσην ἔχῃ, περὶ δὲ τὰς ἄλλας γωνίας τὰς πλευρὰς ἀνάλογον, τῶν δὲ λοιπῶν ἑκατέραν ἅμα ἤτοι ἐλάσσονα ἢ μὴ ἐλάσσονα ὀρθῆς, ἰσογώνια ἔσται τὰ τρίγωνα, καὶ ἴσας ἕξει τὰς γωνίας, περὶ ἃς ἀνάλογόν εἰσιν αἱ πλευραί.

Theor.7.Propo.7.

Si duo triangula vnum angulum vni angulo æqualem, circum autem alios angu-

los latera proportionalia habeant, reliquorum verò ſimul vtrunque aut minorem aut nō minorem recto: æquiangula erūt triangula, & ęquales habebunt eos angulos, circū quos proportionalia ſunt latera.

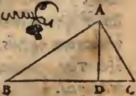


η

Ἐὰν ἐν ὀρθογωνίῳ τριγώνῳ, ἀπὸ τῆς ὀρθῆς γωνίας ἐπὶ τὴν βάσιν κάθετος ἀχθῇ, τὰ πρὸς τῇ καθέτῳ τρίγωνα ὅμοιά ἐστι τῷ τε ὅλῳ, καὶ ἀλλήλοις.

Theor.8.Propo.8.

Si in triangulo rectangulo, ab angulo recto in baſin perpendicularis ducta ſit, quæ ad perpendicularem triangula, tum toti triangulo, tum ipſa inter ſe ſimilia ſunt.

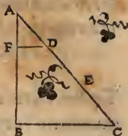


θ

Τῆς δοθείσης εὐθείας τὸ προσταχθὲν μέρος ἀφελεῖν.

Proble.1.Propo.9.

A data recta linea imperatam partem auferre.

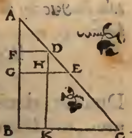


ι

Τὴν δοθεῖσαν εὐθεῖαν ἄτμητον, τῇ δοθείσῃ εὐθείᾳ τετμημένῃ ὁμοίως τεμεῖν.

Problema 2.Propo.10.

Datam rectam lineã insectam similiter secare, vt data altera recta secta fuerit.

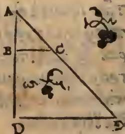


ια

Δύο δοθεισῶν εὐθειῶν, τρίτην ἀνάλογον προσευρεῖν.

Probl.3.Propo.11.

Duab⁹ datis rectis lineis, tertiam proportionalem adinuenire.

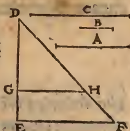


ιβ

Τριῶν δοθεισῶν εὐθειῶν, τετάρτην ἀνάλογον προσευρεῖν.

Probl.4.Propo.12.

Tribus datis rectis lineis, quartam proportionalẽ adinuenire.

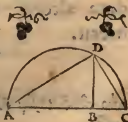


ιγ

Δύο δοθεισῶν εὐθειῶν, μέσην ἀνάλογον προσευρεῖν.

Probl.5.Proposi.13.

Duabus datis rectis lineis, mediam proportionalem adinuenire.

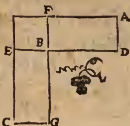


ιδ

Τῶν ἴσων τε καὶ μίαν μιᾷ ἴσην ἐχόντων γωνίαν παραλληλογράμμων, ἀντιπεπόνθασιν αἱ πλευραὶ αἱ περὶ τὰς ἴσας γωνίας· καὶ ὧν παραλληλογράμμων μίαν μιᾷ ἴσην ἐχόντων γωνίαν, ἀντιπεπόνθασιν αἱ πλευραί, αἱ περὶ τὰς ἴσας γωνίας, ἴσα ἐστὶν ἐκεῖνα.

Theor.8.Propo.14.

Æqualium, & vnum vni æqualem habẽtium angulum parallelogrammorum reciproca ſunt latera, quæ circum æquales angulos: & quorum parallelogrammorum vnũ angulum vni angulo æqualem habentium reciproca ſunt latera, quæ circum æquales angulos, illa ſunt æqualia.

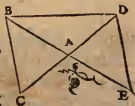


ιδ

Τῶν ἴσων, καὶ μίαν μιᾷ ἴσην ἐχόντων γωνίαν ἰσογώνων ἀντιπεπόνθασιν αἱ πλευραὶ, αἱ περὶ τὰς ἴσας γωνίας: καὶ ὧν μίαν μιᾷ ἴσην ἐχόντων γωνίαν ἀντιπεπόνθασιν αἱ πλευραὶ αἱ περὶ τὰς ἴσας γωνίας, ἴσα ἐστὶν ἐκεῖνα.

Theor.10.Propo.15.

Æqualium, & vnum angulum vni ęqualem habentium triangulorum reciproca ſunt latera, quæ circũ æquales angulos: & quorum triangulorum vnum angulũ vni æqualem habentium reciproca ſunt latera, quæ circũ æquales angulos, illa ſunt æqualia.

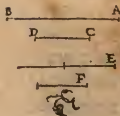


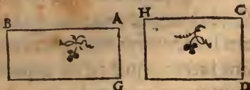
ις

Ἐὰν τέσσαρες εὐθεῖαι ἀνάλογον ὦσι, τὸ ὑπὸ τῶν ἄκρων περιεχόμενον ὀρθογώνιον ἴσον, ἐστὶ τῷ ὑπὸ τῶν μέσων περιεχομένῳ ὀρθογωνίῳ. καὶ εἰ τὸ ὑπὸ τῶν ἄκρων περιεχόμενον ὀρθογώνιον ἴσον ᾖ τῷ ὑπὸ τῶν μέσων περιεχομένῳ ὀρθογωνίῳ, αἱ τέσσαρες εὐθεῖαι ἀνάλογον ἔσονται.

Theor.11.Propo.16.

Si quatuor rectæ lineæ proportionales fuerint,quod ſub extremis comprehēditur rectangulum æquale eſt ei, quod ſub mediis comprehenditur rectangulo. Et ſi ſub extremis comprehenſum rectangulum æquale fuerit ei,quod ſub mediis cōtinetur rectangulo,illæ quatuor rectæ lineæ proportionales erunt.



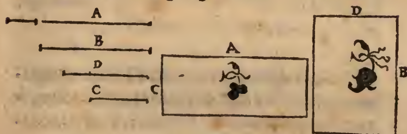


ιζ

Ἐὰν τρεῖς εὐθεῖαι ἀνάλογον ὦσι, τὸ ὑπὸ τῶν ἄκρων περιεχόμενον ὀρθογώνιον ἴσον ἐστὶ τῷ ἀπὸ τῆς μέσης τετραγώνῳ· καὶ εἰ τὸ ὑπὸ τῶν ἄκρων περιεχόμενον ὀρθογώνιον ἴσον ᾖ τῷ ἀπὸ τῆς μέσης τετραγώνῳ, αἱ τρεῖς εὐθεῖαι ἀνάλογον ἔσονται.

Theor.12.Propo.17.

Si tres rectæ lineæ ſint proportionales, quod ſub extremis comprehenditur rectangulum æquale eſt ei, quod à media deſcribitur quadrato: & ſi ſub extremis comprehenſum rectangulum æquale ſit ei quod à media deſcribitur quadrato, illæ tres rectę lineæ proportionales erunt.

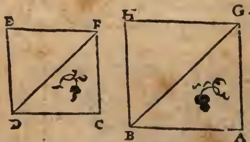


ιη

Ἀπὸ τῆς δοθείσης εὐθείας, τῷ δοθέντι εὐθυγράμμῳ ὅμοιον καὶ ὁμοίως κείμενον εὐθύγραμμον ἀναγράψαι.

Probl.6.Propo.18.

A data recta linea, dato rectilineo ſimile ſimiliterque poſitum rectilineum deſcribere.

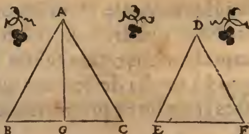


ιθ

τὰ ὅμοια τρίγωνα πρὸς ἄλληλα ἐν διπλασίονι λόγῳ ἐστὶ τῶν ὁμολόγων πλευρῶν.

Theor.13.Propo.19.

Similia triangula inter se sunt in duplicata ratione laterũ homologorum.

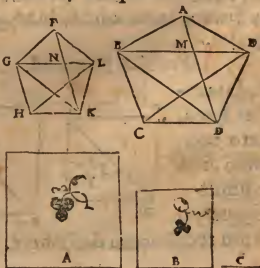


κ

τὰ ὅμοια πολύγωνα εἰς τὰ ὅμοια τρίγωνα διαιρεῖται, καὶ εἰς ἴσα τὸ πλῆθος, καὶ ὁμόλογα τοῖς ὅλοις· καὶ τὸ πολύγωνον διπλασίονα λόγον ἔχει, ἤπερ ἡ ὁμόλογος πλευρὰ πρὸς τὴν ὁμόλογον πλευράν.

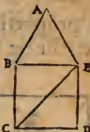
Theor.14. Propo.20.

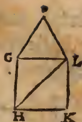
Similia polygωna in similia triangula diuiduntur, & numero æqualia, & homologa totis. Et polygωna du



plicatam

plicatā habent eam inter se rationem, quā latus homologum ad homologum latus.





κα

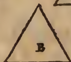
Τὰ τῷ αὐτῷ εὐθυγράμμῳ ὅμοια, καὶ ἀλλήλοις ἐστὶν ὅμοια.

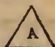
Theor.15. Propo.21.

Quæ eidē rectilineo sunt similia, & inter se sunt similia.









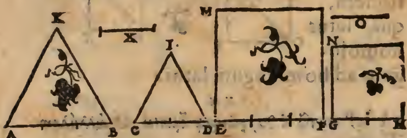
κβ

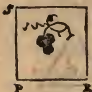
Ἐὰν τέσσαρες εὐθεῖαι ἀνάλογον ὦσιν, καὶ τὰ ἀπ' αὐτῶν εὐθύγραμμα ὅμοιά τε καὶ ὁμοίως ἀναγεγραμμένα ἀνάλογον ἔσται. κἂν τὰ ἀπ' αὐτῶν εὐθύγραμμα ὅμοιά τε καὶ ὁμοίως ἀναγεγραμμένα ἀνάλογον ᾖ, καὶ αὗται αἱ εὐθεῖαι ἀνάλογον ἔσονται.

Theor.16. Propo.22.

Si quatuor rectæ lineæ proportionales fuerint: & ab eis rectilinea similia similitérque descripta proportionalia erunt. Et si à rectis lineis similia similitérque

deſcripta rectilinea proportionalia fuerint, ipſæ etiam rectæ lineæ proportionales erunt.

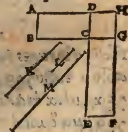




κγ

τὰ ἰσογώνια παραλληλόγραμμα πρὸς ἄλληλα λόγον ἔχει τὸν συγκείμενον ἐκ τῶν πλευρῶν.

Theor.17. Propo.23.



Æquiangula parallelogramma inter ſe ratione habent eam, quæ ex lateribus componitur.

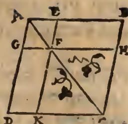
κδ

Παντὸς παραλληλογράμμου τὰ περὶ τὴν διάμετρον παραλληλόγραμμα, ὅμοιά ἐστι τῷ τε ὅλῳ καὶ ἀλλήλοις.

Theor.18. Propo.24.

In omni parallelogrãmo, quæ circa dia-

metrum sunt parallelogramma, & toti & inter se sunt similia.

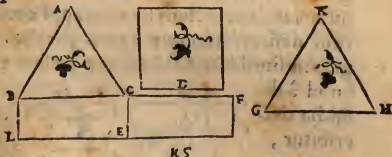


κε

τῷ δοθέντι εὐθυγράμμῳ ὅμοιον, καὶ ἄλλῳ τῷ δοθέντι ἴσον τὸ αὐτὸ συστήσασθαι.

Probl.7.Propo.25.

Dato rectilineo simile, & alteri dato æquale idem constituere.

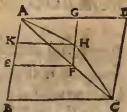


κϛ

Ἐὰν ἀπὸ παραλληλογράμμου παραλληλόγραμμον ἀφαιρεθῇ ὅμοιόν τε τῷ ὅλῳ καὶ ὁμοίως κείμενον, κοινὴν γωνίαν ἔχον αὐτῷ, περὶ τὴν αὐτὴν διάμετρόν ἐστι τῷ ὅλῳ.

Theor.19.Propo.26.

Si à parallelogrammo pa rallelo grãmum ablatum sit & simile toti & similiter positum communem



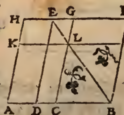
cum eo habens angulum, hoc circum candem cum toto diametrum consistit.

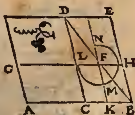
κζ

Πάντων τῶν παρὰ τὴν αὐτὴν εὐθεῖαν παραβαλλομένων παραλληλογράμμων, καὶ ἐλλειπόντων εἴδεσι παραλληλογράμμοις ὁμοίοις τε καὶ ὁμοίως κειμένοις τῷ ἀπὸ τῆς ἡμισείας ἀναγραφομένῳ, μέγιστόν ἐστι τὸ ἀπὸ τῆς ἡμισείας παραβαλλόμενον παραλληλόγραμμον, ὅμοιον ὂν τῷ ἐλλείμματι.

Theor. 20. Propo. 27.

Omnium parallelogrammorum secundum eandem rectam lineam applicatorum deficientiúmque figuris parallelogrãmis similibus similitérque positis ei, quod à dimidia describitur, maximum id est quod ad dimidiã applicatur parallelogrãmum simile existens defectui.





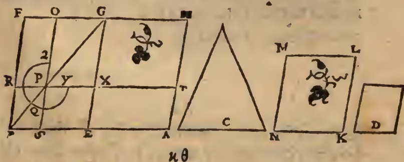
κη

Παρὰ τὴν δοθεῖσαν εὐθεῖαν, τῷ δοθέντι εὐθυγράμμῳ ἴσον παραλληλόγραμμον παραβαλεῖν, ἐλλεῖπον εἴδει παραλληλογράμμῳ ὁμοίῳ ὄντι τῷ δοθέντι. δεῖ δὴ τὸ διδόμενον εὐθύγραμμον, ᾧ

δεῖ ἴσον παραβάλλειν, μὴ μεῖζον εἶναι τοῦ ἀπὸ τῆς ἡμισείας παραβαλλομένου, ὁμοίων ὄντων τῶν ἐλλειμμάτων, τοῦ τε ἀπὸ τῆς ἡμισείας καὶ ᾧ δεῖ ὅμοιον ἐλλείπειν.

Probl.8.Propo.28.

Ad datam lineam rectam, dato rectilineo æquale parallelogrammum applicare deficiens figura parallelogramma, quæ similis sit alteri rectilineo dato. Oportet autem datum rectilineum, cui æquale applicandum est, non maius esse eo quod ad dimidiam applicatur, cùm similes sint defectus & eius quod à dimidia describitur, & eius cui simile desse debet.



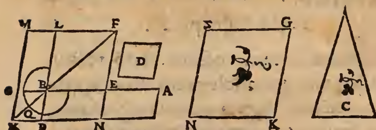
κθ

παρὰ τὴν δοθεῖσαν, εὐθεῖαν τῷ δοθέντι εὐθυγράμμῳ ἴσον παραλληλόγραμμον παραβάλλειν ὑπερβάλλον εἴδει παραλληλογράμμῳ ὁμοίῳ τῷ δοθέντι.

Probl.9.Propo.29.

Ad datam rectam lineam, dato rectili-

neo æquale parallelogrammum applicare, excedens figura parallelogrãma, quæ ſimilis ſit parallelogrammo alteri dato.

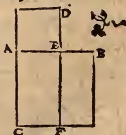


λ

τὴν δοθεῖσαν εὐθεῖαν πεπερασμένην, ἄκρον καὶ μέσον λόγον τεμεῖν.

Proble.10.Propo.30.

Propoſitam rectam lineam terminatam, extrema ac media ratione ſecare.



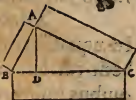
λα

ἐν τοῖς ὀρθογωνίοις τριγώνοις, τὸ ἀπὸ τῆς τὴν ὀρθὴν γωνίαν ὑποτεινούσης πλευρᾶς εἶδος ἴσον ἐστὶ τοῖς ἀπὸ τῶν τὴν ὀρθὴν γωνίαν περιεχουσῶν πλευρῶν εἴδεσι τοῖς ὁμοίοις τε καὶ ὁμοίως ἀναγραφομένοις.

Theor.21.Propo.31.

In rectangulis triangulis, figura quæuis à latere rectum angulum ſubtendente

descripta æqualis est figuris, quæ priori illi similes & similiter positæ à lateribus rectum angulum cõtinentibus describuntur.

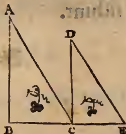


λβ

Ἐὰν δύο τρίγωνα συντεθῇ κατὰ μίαν γωνίαν τὰς δύο πλευρὰς ταῖς δυσὶ πλευραῖς ἀνάλογον ἔχοντα, ὥστε τὰς ὁμολόγους αὐτῶν πλευρὰς καὶ παραλλήλους εἶναι, αἱ λοιπαὶ τῶν τριγώνων πλευραὶ ἐπ' εὐθείας ἔσονται.

Theor.22.Propo.32.

Si duo triangula, quæ duo latera duobus lateribus proportionalia habeant, secundum vnum angulum composita fuerint, ita vt homologa eorum latera sint etiam parallela, tum reliqua illorũ triãgulorum latera in rectam lineam collocata reperientur.



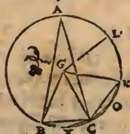
λγ

Ἐν τοῖς ἴσοις κύκλοις αἱ γωνίαι τὸν αὐτὸν λόγον ἔχουσι ταῖς περιφερείαις, ἐφ' ὧν βεβήκασιν, ἐάντε πρὸς τοῖς κέντροις, ἐάντε πρὸς ταῖς περιφερείαις ὦσι βεβηκυῖαι. ἔτι δὲ καὶ οἱ τομεῖς, ἅτε πρὸς

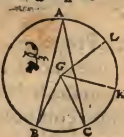
τοῖς κέντροις συνιστάμενοι.

Theor. 23. Propo. 33.

In æqualibus circulis anguli eãdem habent rationem cum ipſis peripheriis in quibus inſiſtunt, ſiue ad cẽtra, ſiue ad peripherias conſtituti illis inſiſtant peripheriis Inſuper verò & ſectores, quippe qui ad cẽtra conſiſtunt.

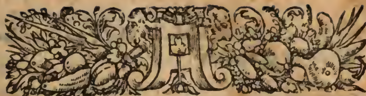








Elementi ſexti finis.



ΕΥΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ἕβδομον.

EVCLIDIS ELEMENTVM SEPTIMVM.

ὅροι.

α

Μονάς ἐστι, καθ' ἣν ἕκαστον τῶν ὄντων ἓν λέγεται.

DEFINITIONES.

1

Vnitas, eſt ſecundum quam entiũ quodque dicitur vnum.

β

Ἀριθμὸς δὲ, τὸ ἐκ μονάδων συγκείμενον πλῆθος.

2

Numerus autem, ex vnitatibus compoſita multitudo.

γ

Μέρος ἐστὶν ἀριθμὸς ἀριθμοῦ ὁ ἐλάσσων τοῦ μείζονος, ὅταν καταμετρῇ τὸν μείζονα.

3

Pars, est numerus numeri minor maioris, cùm minor metitur maiorem.

δ

Μέρη δὲ, ὅταν μὴ καταμετρῇ.

4

Partes autem, cùm non metitur.

ε

Πολλαπλάσιος δὲ, ὁ μείζων τοῦ ἐλάττονος, ὅταν καταμετρῆται ὑπὸ τοῦ ἐλάττονος.

5

Multiplex verò, maior minoris, cùm maiorem metitur minor.

ς

Ἄρτιος δὲ ἀριθμός ἐστιν, ὁ δίχα διαιρούμενος.

6

Par numerus, est qui bifariam diuiditur.

ζ

Περισσὸς δὲ, ὁ μὴ διαιρούμενος δίχα. ἤ, ὁ μονάδι διαφέρων ἀρτίου ἀριθμοῦ.

7

Impar verò, qui bifariam non diuiditur. vel, qui vnitate differt à pari.

η

Ἀρτιάκις ἄρτιος ἀριθμός ἐστιν, ὁ ὑπὸ ἀρτίου ἀ-

ριθμοῦ μετρούμενος κατὰ ἄρτιον ἀριθμόν.

8

Pariter par numerus, eſt quem par numerus metitur per numerum parem.

θ

Ἀρτιάκις δὲ περισσός ἐστιν, ὁ ὑπὸ ἀρτίου ἀριθμοῦ μετρούμενος κατὰ περισσὸν ἀριθμόν.

9

Pariter autem impar, eſt quē par numerus metitur per numerum imparem.

ι

Περισσάκις δὲ περισσός ἐστιν ἀριθμός, ὁ ὑπὸ περισσοῦ μετρούμενος κατὰ περισσὸν ἀριθμόν.

10

Impariter verò impar numerus, eſt quē impar numerus metitur per numerum imparem.

ια

Πρῶτος ἀριθμός ἐστιν, ὁ μονάδι μόνῃ μετρούμενος.

11

Primus numerus, eſt quem vnitas ſola metitur.

ιβ

Πρῶτοι πρὸς ἀλλήλους ἀριθμοί εἰσιν, οἱ μονάδι μόνῃ μετρούμενοι κοινῷ μέτρῳ.

12

Primi inter ſe numeri ſunt, quos ſola vnitas menſura communis metitur.

ιγ

Σύνθετος ἀριθμός ἐστιν, ὁ ἀριθμῷ τινὶ μετρούμενος.

13

Compoſitus numerus eſt, quem numerus quiſpiam metitur.

ιδ

Σύνθετοι δὲ πρὸς ἀλλήλους ἀριθμοί εἰσιν, οἱ ἀριθμῷ τινὶ μετρούμενοι κοινῷ μέτρῳ.

14

Compoſiti autem inter ſe numeri, ſunt quos numerus aliquis menſura communis metitur.

ιε

Ἀριθμὸς ἀριθμὸν πολλαπλασιάζειν λέγεται, ὅταν ὅσαι εἰσὶν ἐν αὐτῷ μονάδες, τοσαυτάκις συντεθῇ ὁ πολλαπλασιαζόμενος, καὶ γένηταί τις.

15

Numerus numerũ multiplicare dicitur, cùm toties compoſitus fuerit is qui multiplicatur, quot ſunt in illo multiplicãte vnitates, & procreatus fuerit aliquis.

ις

Ὅταν δὲ δύο ἀριθμοὶ πολλαπλασιάσαντες ἀλλήλους ποιῶσι τινά, ὁ γενόμενος ἐπίπεδος καλεῖται, πλευραὶ δὲ αὐτοῦ, οἱ πολλαπλασιάσαντες ἀλλήλους ἀριθμοί.

16

Cùm autẽ duo numeri mutuò ſeſe mul-

tiplicantes quempiam faciunt, qui factus erit planus appellabitur, qui verò numeri mutuò sese multiplicarint, illius latera dicentur.

ιζ

Ὅταν δὲ τρεῖς ἀριθμοὶ πολλαπλασιάζοντες ἀλλήλους ποιῶσί τινα, ὁ γενόμενος στερεὸς καλεῖται, πλευραὶ δὲ αὐτῶν οἱ πολλαπλασιάζοντες ἀλλήλους ἀριθμοί.

17

Cùm verò tres numeri mutuò sese multiplicantes quempiam faciunt, qui procreatus erit solidus appellabitur, qui autem numeri mutuò sese multiplicarint, illius latera dicentur.

ιη

Τετράγωνος ἀριθμός ἐστιν, ὁ ἰσάκις ἴσος. ἤ, ὁ ὑπὸ δύο ἴσων ἀριθμῶν περιεχόμενος.

18

Quadratus numerus, est qui æqualiter æqualis. vel, qui à duobus æqualibus numeris continetur.

ιθ

Κύβος δὲ, ὁ ἰσάκις ἴσος ἰσάκις. ἤ, ὁ ὑπὸ τριῶν ἴσων ἀριθμῶν περιεχόμενος.

19

Cubus verò, qui æqualiter equalis æqualiter. vel, qui à tribus æqualibus numeris continetur.

κ

Ἀριθμοὶ ἀνάλογόν εἰσιν, ὅταν ὁ πρῶτος τοῦ δευτέρου, ὁ τρίτος τοῦ τετάρτου ἰσάκις ᾖ πολλαπλάσιος, ἢ τὸ αὐτὸ μέρος, ἢ τὰ αὐτὰ μέρη ὦσιν.

20

Numeri proportionales ſunt, cùm primus ſecundi, & tertius quarti æquè múltiplex eſt, vel eadem pars, vel eædem partes.

κα

Ὅμοιοι ἐπίπεδοι καὶ στερεοὶ ἀριθμοί εἰσιν, οἱ ἀνάλογον ἔχοντες τὰς πλευράς.

21

Similes plani & ſolidi numeri ſunt, qui proportionalia habent latera.

κβ

Τέλειος ἀριθμός ἐστιν, ὁ τοῖς ἑαυτοῦ μέρεσιν ἴσος ὤν.

22

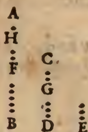
Perfectus numerus, eſt qui ſuis ipſius partibus eſt æqualis.

Προτάσεις.

α

Ἐὰν δύο ἀριθμῶν ἀνίσων ἐκκειμένων, ἀνθυφαιρουμένου ἀεὶ τοῦ ἐλάσσονος ἀπὸ τοῦ μείζονος ὁ λειπόμενος μηδέποτε καταμετρῇ τὸν πρὸ ἑαυτοῦ ἕως οὗ λειφθῇ μονάς, οἱ ἐξ ἀρχῆς ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ἔσονται.

Theor.1. Propo.1.

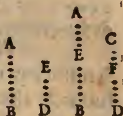


Duobus numeris inæqualibus propositis, si detrahatur semper minor de maiore, alterna quadam detractione, neque reliquus vnquam metiatur præcedentem quoad assumpta sit vnitas: qui principio propositi sunt numeri primi inter se erunt.

β

Δύο ἀριθμῶν δοθέντων μὴ πρώτων πρὸς ἀλλήλους, τὸ μέγιστον αὐτῶν κοινὸν μέτρον εὑρεῖν.

Probl.1. Propo.2.



Duobus numeris datis non primis inter se, maximam eorum communem mensuram reperire.

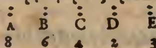
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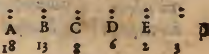
Τριῶν ἀριθμῶν δοθέντων μὴ πρώτων πρὸς ἀλλήλους, τὸ μέγιστον αὐτῶν κοινὸν μέτρον εὑρεῖν.

Problema 2.

Propo.3.



Tribus numeris datis non primis



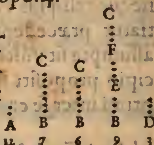
inter se, maximam eorum communem mensuram reperire.

δ

Πᾶς ἀριθμὸς παντὸς ἀριθμοῦ, ὁ ἐλάσσων τοῦ μείζονος, ἤτοι μέρος ἐστὶν, ἢ μέρη.

Theor. 2. Propo. 4.

Omnis numerus, cuiusque numeri minor maioris aut pars est, aut partes.

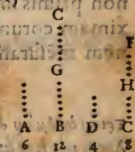


ε

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρος ᾖ, καὶ ἕτερος ἑτέρου τὸ αὐτὸ μέρος, καὶ συναμφότερος συναμφοτέρου τὸ αὐτὸ μέρος ἔσται, ὅπερ ὁ εἷς τοῦ ἑνός.

Theor. 3. Propo. 5.

Si numerus numeri pars fuerit, & alter alterius eadem pars, & simul vterque vtriusque simul eadẽ pars erit, quæ vnus est vnius.



ς

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρη ᾖ, καὶ ἕτερος ἑτέρου τὰ αὐτὰ μέρη ᾖ, καὶ συναμφότερος συναμφοτέρου τὰ αὐτὰ μέρη ἔσται, ἅπερ ὁ εἷς τοῦ ἑνός.

Theor.

Theor. 4. Propo. 6.

Si numerus sit numeri partes, & alter alteri⁹ eædem partes, & simul vterque vtriusque simul eadẽ partes erunt, quæ sunt vnus vnius.

ζ

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρος ᾖ ὅπερ ἀφαιρεθεὶς ἀφαιρεθέντος, καὶ ὁ λοιπὸς τοῦ λοιποῦ τὸ αὐτὸ μέρος ἔσται ὅπερ ὁ ὅλος τοῦ ὅλου.

Theor. 5. Propo. 7.

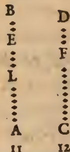
Si numerus numeri eadẽ sit pars quæ detractus detracti, & reliquus reliqui eadẽ pars erit quæ totus est totius.

η

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρη ᾖ ἅπερ ἀφαιρεθεὶς ἀφαιρεθέντος, καὶ ὁ λοιπὸς τοῦ λοιποῦ τὰ αὐτὰ μέρη ἔσται ἅπερ ὁ ὅλος τοῦ ὅλου.

Theor.6.Propo.8.

Si numerus numeri eædē ſint partes quæ detractus detracti, & reliquus reliqui eędem partes erunt, quæ ſunt totus totius.



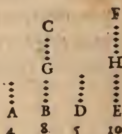
G···M.K···N.H.

θ

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρος ᾖ, καὶ ἕτερος ἑτέρου τὸ αὐτὸ μέρος, καὶ ἐναλλὰξ, ὃ μέρος ἐστὶν ἢ μέρη ὁ πρῶτος τοῦ τρίτου, τὸ αὐτὸ μέρος ἔσται ἢ τὰ αὐτὰ μέρη, καὶ ὁ δεύτερος τοῦ τετάρτου.

Theor.7.Propo.9.

Si numerus numeri pars ſit, & alter alterius eadē pars, & viciſsim quę pars eſt vel partes primus tertii, eadē pars erit vel eędem partes & ſecundus quarti.



ι

Ἐὰν ἀριθμὸς ἀριθμοῦ μέρη ᾖ, καὶ ἕτερος ἑτέρου τὰ αὐτὰ μέρη, καὶ ἐναλλὰξ ἃ μέρη ἐστὶν ὁ πρῶτος τοῦ τρίτου ἢ μέρος, τὰ αὐτὰ μέρη ἔσται καὶ ὁ δεύτερος τοῦ τετάρτου, ἢ μέρος.

Theor.8. Propo.10.

Si numerus numeri partes ſint, & alter alterius eædem partes, etiam viciſsim quæ ſunt partes aut pars primus tertii, eædem partes erunt vel pars & ſecundus quarti.

H G A 4 · C 6 · E H D 10 · F 18

ια

Ἐὰν ᾖ ὅλος πρὸς ὅλον, οὕτως ἀφαιρεθεὶς πρὸς ἀφαιρεθέντα, καὶ ὁ λοιπὸς πρὸς τὸν λοιπὸν ἔσται ὡς ὅλος πρὸς ὅλον.

Theor.9. Propo.11.

Si quemadmodum ſe habet totus ad totũ ita detractus ad detractum, & reliquus ad reliquum ita habebit vt totus ad totum.

B E A 6 · D F C 3

ιβ´

Ἐὰν ὦσιν ὁποσοιοῦν ἀριθμοὶ ἀνάλογον, ἔσται ὡς εἷς τῶν ἡγουμένων πρὸς ἕνα τῶν ἑπομένων, οὕτως ἅπαντες οἱ ἡγούμενοι πρὸς ἅπαντας τοὺς ἑπομένους.

Theor.10. Propo.12.

Si ſint quotcunque numeri proportionales, quẽadmodum ſe habet vnus antecedentium ad vnum ſequentium, ita

A 9 · B 6 · C 3 · D 2

ſe habebunt omnes antecedentes ad omnes conſequentes.

ιγ

Ἐὰν τέσσαρες ἀριθμοὶ ἀνάλογον ὦσι, καὶ ἐναλλὰξ ἀνάλογον ἔσονται.

Theor.11. Propo.13.

Si quatuor numeri ſint proportionales, & viciſſim proportionales erũt.

A	B	C	D
12	4	9	3

ιδ

Ἐὰν ὦσιν ὁποσοιοῦν ἀριθμοί, καὶ ἄλλοι αὐτοῖς ἴσοι τὸ πλῆθος σύνδυο λαμβανόμενοι καὶ ἐν τῷ αὐτῷ λόγῳ, καὶ δι' ἴσου ἐν τῷ αὐτῷ λόγῳ ἔσονται.

Theor.12. Propo.14.

Si ſint quotcunque numeri & alii illis æquales multitudine, qui bini ſumantur & in eadem ratione: etiam ex æqualitate in eadem ratione erunt.

A	B	C	D	E	F
12	6	3	8	4	2

ιε

Ἐὰν μονὰς ἀριθμόν τινα μετρῇ, ἰσάκις δὲ ἕτερος ἀριθμὸς ἄλλον τινὰ ἀριθμὸν μετρῇ, καὶ ἐναλλὰξ ἰσάκις ἡ μονὰς τὸν τρίτον ἀριθμὸν μετρήσει καὶ ὁ δεύτερος τὸν τέταρτον.

Theor.13.Propo.15.

Si vnitas numerum quẽpiam metiatur, alter verò numerus alium quẽdam numerũ æquè metiatur, & viciſsim vnitas tertiũ numerũm ęquè metietur atque ſecundus quartum.

A 1 · C H G B 3 · D 2 · F L K E 6

ις

Ἐὰν δύο ἀριθμοὶ πολλαπλασιάζοντες ἀλλήλους ποιῶσι τινάς, οἱ γενόμενοι ἐξ αὐτῶν ἴσοι ἀλλήλοις ἔσονται.

Theor.14.Propo.16.

Si duo numeri mutuò ſeſe multiplicantes faciãt aliquos, qui ex illis geniti fuerint inter ſe æquales erunt.

E 1 · A 2 · B 4 · C 8 · D 8

ιζ

Ἐὰν ἀριθμὸς δύο ἀριθμοὺς πολλαπλασιάζας ποιῇ τινάς, οἱ γενόμενοι ἐξ αὐτῶν τὸν αὐτὸν λόγον ἔχουσι πολλαπλασιαθεῖσιν.

Theor.15.propo.17.

Si numerus duos numeros multiplicans

faciat aliquos, qui ex illis procreati erunt eandem rationem habebunt quam multiplicati.

I	A	B	C	D	E
1	3	4	5	12	15

ιη

Ἐὰν δύο ἀριθμοὶ ἀριθμόν τινα πολλαπλασιάσαντες ποιῶσί τινας, οἱ γενόμενοι ἐξ αὐτῶν τὸν αὐτὸν ἕξουσι λόγον τοῖς πολλαπλασιάσασι.

Theor.16.propo.18.

Si duo numeri numerum quempiam multiplicantes faciant aliquos, geniti ex illis eandem habebunt rationem, quam qui illum multiplicarunt.

A	B	C	D	E
4	5	3	12	15

ιθ

Ἐὰν τέσσαρες ἀριθμοὶ ἀνάλογον ὦσιν, ὁ ἐκ τοῦ πρώτου καὶ τετάρτου γινόμενος ἀριθμὸς, ἴσος ἔσται τῷ ἐκ τοῦ δευτέρου καὶ τρίτου γινομένῳ ἀριθμῷ. καὶ ἐὰν ὁ ἐκ τοῦ πρώτου καὶ δευτέρου γενόμενος ἀριθμὸς ἴσος ᾖ τῷ ἐκ τοῦ δευτέρου καὶ τρίτου, οἱ τέσσαρες ἀριθμοὶ ἀνάλογον ἔσονται.

Theor.17.Propo.19.

Si quatuor numeri ſint proportionales, qui ex primo & quarto fit æqualis erit ei qui ex ſecundo & tertio: & ſi qui ex primo & quarto fit numerus æqualis ſit ei

qui ex ſecundo & tertio, illi quatuor numeri porportionales erunt.

A	B	C	D	E	F	G
6	4	3	2	12	12	18

κ

Ἐὰν τρεῖς ἀριθμοὶ ἀνάλογον ὦσιν, ὁ ὑπὸ τῶν ἄκρων ἴσος ἐστὶ τῷ ἀπὸ τοῦ μέσου. ἐὰν δὲ ὁ ὑπὸ τῶν ἄκρων ἴσος ᾖ τῷ ἀπὸ τοῦ μέσου, οἱ τρεῖς ἀριθμοὶ ἀνάλογον ἔσονται.

Theor.18.Propo.20.

Si tres numeri ſint proportionales, qui ab extremis cõtinetur æqualis eſt ei qui à medio efficitur. Et ſi qui ab extremis continetur æqualis ſit ei qui à medio deſcribitur, illi tres numeri proportionales erunt.

A	B	C	D
9	6	4	6

κα

Οἱ ἐλάχιστοι ἀριθμοὶ τῶν τὸν λόγον ἐχόντων αὐτοῖς, μετροῦσι τοὺς τὸν αὐτὸν λόγον ἔχοντας αὐτοῖς ἰσάκις, ὅ,τε μείζων τὸν μείζονα, καὶ ὁ ἐλάττων τὸν ἐλάττονα.

Theor.19. Propo.21.

Minimi numeri omniũ qui eandem cum eis rationẽ habent, æqualiter metiuntur numeros ean-

D	L		
G	H		
C	E	A	B
4	3	8	6

dem rationem habentes, maior quidem maiorem, minor verò minorem.

κβ

Ἐὰν ὦσι τρεῖς ἀριθμοὶ καὶ ἄλλοι αὐτοῖς ἴσοι τὸ πλῆθος, σύνδυο λαμβανόμενοι ἐν τῷ αὐτῷ λόγῳ, ᾖ δὲ τεταραγμένη αὐτῶν ἡ ἀναλογία, καὶ δι' ἴσου ἐν τῷ αὐτῷ λόγῳ ἔσονται.

Theor.20.Propo.22.

Si tres sint numeri & alii multitudine illis æquales, qui bini sumantur & in eadẽ ratione, sit autem perturbata eorũ proportio, etiã ex æqualitate in eadẽ ratione erunt.

A	B	C	D	E	F
6	4	3	12	8	6

κγ

Οἱ πρῶτοι πρὸς ἀλλήλους ἀριθμοὶ ἐλάχιστοι εἰσι τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς.

Theor.21.Propo.23.

Primi inter se numeri minimi sunt omnium eãdem cum eis rationem habẽtium.

A	B	E	C	D
5	6	2	4	3

κδ

Οἱ ἐλάχιστοι ἀριθμοὶ τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς πρῶτοι πρὸς ἀλλήλους εἰσίν.

Theorem.22. Propositio 24.

Minimi numeri omnium eandem cũ eis rationem habẽtium, primi ſunt inter ſe.

A	B	C	D	E
8	6	4	3	2

κε

Ἐὰν δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσιν, ὁ τὸν ἕνα αὐτῶν μετρῶν ἀριθμὸς πρὸς τὸν λοιπὸν πρῶτος ἔσται.

Theor.23.Propo.25.

Si duo numeri ſint primi inter ſe, qui alterutrum illorũ metitur numerus, is ad reliquum primus erit.

A	B	C	D
6	7	3	4

κϛ

Ἐὰν δύο ἀριθμοὶ πρός τινα ἀριθμὸν πρῶτοι ὦσιν, καὶ ὁ ἐξ αὐτῶν γενόμενος πρὸς τὸν αὐτὸν πρῶτος ἔσται.

Theor.24.Propo.26.

Si duo numeri ad quempiam numerũ primi ſint, ad eundẽ primus is quoque futurus eſt qui ab illis productus fuerit.

3 B

A	C	D	E	F
5	5	5	3	2

κζ

Ἐὰν δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσιν, ὁ ἐκ τοῦ ἑνὸς αὐτῶν γενόμενος πρὸς τὸν λοιπὸν πρῶτος ἔσται.

Theor.25.Propo.27.

Si duo numeri primi ſint inter ſe, qui ab vno eorũ gignitur ad reliquum primus erit.

A B C D
7 6 3

κη

Ἐὰν δύο ἀριθμοὶ πρὸς δύο ἀριθμοὺς ἀμφότεροι πρὸς ἑκάτερον πρῶτοι ὦσι, καὶ οἱ ἐξ αὐτῶν γενόμενοι πρῶτοι πρὸς ἀλλήλους ἔσονται.

Theor.26.Propo.28.

Si duo numeri ad duos numeros ambo ad vtrumque primi ſint, & qui ex eis gignentur primi inter ſe erunt.

A B E C D F
3 5 15 2 4 8

κθ

Ἐὰν δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσι, καὶ πολλαπλασιάσας ἑκάτερος ἑαυτὸν ποιῇ τινά, οἱ γενόμενοι ἐξ αὐτῶν πρῶτοι πρὸς ἀλλήλους ἔσονται. κἂν οἱ ἐξ ἀρχῆς τοὺς γενομένους πολλαπλασιάσαντες ποιῶσι τινάς, κἀκεῖνοι πρῶτοι πρὸς ἀλλήλους ἔσονται, καὶ ἀεὶ περὶ τοὺς ἄκρους τοῦτο συμβαίνει.

Theor.27.Propo.29.

Si duo numeri primi ſint inter ſe,& multiplicãs vterq; ſeipſum procreet aliquẽ, qui ex iis producti fuerint, primi inter ſe erunt. Quòd ſi numeri initio propoſiti multiplicantes eos qui producti ſunt,efficerint aliquos, hi quoque inter ſe primi erunt,& circa extremos idem hoc ſemper eueniet.

A	C	E	B	D	F
3	6	27	4	16	63

λ

Ἐὰν δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσι, καὶ συναμφότερος πρὸς ἑκάτερον αὐτῶν πρῶτος ἔσται· καὶ ἐὰν συναμφότερος πρὸς ἕνα τινὰ αὐτῶν πρῶτος ᾖ, καὶ οἱ ἐξ ἀρχῆς ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ἔσονται.

Theor.28.Propo.30.

Si duo numeri primi ſint inter ſe, etiam ſimul vterque ad vtrunque illorum primus erit. Et ſi ſimul vterque ad vnum aliquem eorũ primus ſit, etiã qui initio poſit i ſunt numeri primi inter ſe erunt.

A	C B	D
7	5	4

λα

Ἅπας πρῶτος ἀριθμὸς πρὸς ἅπαντα ἀριθμόν, ὃν μὴ μετρεῖ, πρῶτός ἐστιν.

Theor.29.Prop.31.

Omnis primus numerus ad omnem numerum quem nõ metitur, primus est. λβ

A	B	C
7	10	5

Ἐὰν δύο ἀριθμοὶ πολλαπλασιάσαντες ἀλλήλους ποιῶσί τινα, τὸν δὲ γενόμενον ἐξ αὐτῶν μετρῇ τις πρῶτος ἀριθμός, καὶ ἕνα τῶν ἐξ ἀρχῆς μετρήσει.

Theor.30.Propo.31.

Si duo numeri sese mutuò multiplicãtes faciant aliquem, hũc autem ab illis productũ metiatur primus quidam numerus, is alterum etiam metitur eorũ qui initio positi erant. λγ

A	B	C	D	E
2	6	12	3	4

Ἅπας σύνθετος ἀριθμὸς, ὑπὸ πρώτου τινὸς ἀριθμοῦ μετρεῖται.

Theor.31.Prop.33.

Omnẽ cõpositum numerum aliquis primus metietur. λδ

A	B	C
27	9	3

Ἅπας ἀριθμὸς ἤτοι πρῶτος ἐστὶν, ἢ ὑπὸ πρώτου τινὸς ἀριθμοῦ μετρεῖται.

Theor.32.Pro.34.

Omnis numer⁹ aut primus est, aut cũ aliquis primus metitur. λε

A	A
3	6	3

Ἀριθμῶν δοθέντων ὁποσωνοῦν εὑρεῖν τοὺς ἐλαχίστους τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς.

Probl.3.Propo.35.

Numeris datis quotcunque, reperire minimos omnium qui eandem cum illis ra

tionem habeant.

A B C D E F G H K I M
6 8 12 2 3 4 6 2 3 4 3

λϛ

Δύο ἀριθμῶν δοθέντων, εὑρεῖν ὃν ἐλάχιστον μετρῦσιν ἀριθμόν.

Probl.4.Propo.36.

B
A C D E F
7 12 8 4 5

Duobus numeris datis, reperire quem illi minimum metiantur numerum.

B
A
F E C D G H
6 9 12 9 2 3

λζ

Ἐὰν δύο ἀριθμοὶ ἀριθμόν τινα μετρῶσι, καὶ ὁ ἐλάχιστος ὑπ' αὐτῶν μετρούμενος τὸν αὐτὸν μετρήσει.

Theor.33.Propo.37.

Si duo numeri numerum quempiam metiantur, & minimus quem illi metiuntur eũdem metietur.

F
A B E C
2 3 6 12

λη

Τριῶν ἀριθμῶν δοθέντων, εὑρεῖν ὃν ἐλάχιστον μετρῦσιν ἀριθμόν.

Probl.5.Prop.38.

Tribus numeris datis reperire quẽ minimum numerum illi metiãtur.

A B C D E
3 4 6 12 8

A B C D E F
3 6 8 12 24 16

λθ

Ἐὰν ἀριθμὸς ὑπό τινος ἀριθμοῦ μετρῆται, ὁ μετρούμενος ὁμώνυμον μέρος ἕξει τῷ μετροῦντι.

Theor.34. Propo.39.

Si numerum quispiam numerus metiatur, mensus partem habebit metienti cognominem.

A	B	C	D
12	4	3	1

μ

Ἐὰν ἀριθμὸς μέρος ἔχῃ ὁτιοῦν, ὑπὸ ὁμωνύμου ἀριθμοῦ μετρηθήσεται τῷ μέρει.

Theor.35. Propo.40.

Si numerus partem habuerit quamlibet, illum metietur numerus parti cognominis.

A	B	C	D
8	4	2	1

μα

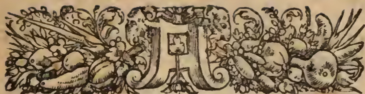
Ἀριθμὸν εὑρεῖν, ὃς ἐλάχιστος ὢν ἕξει τὰ δοθέντα μέρη.

Proble.6. Propo.41.

Numerum reperire, qui minimus cùm sit, datas habeat partes.

A	B	C	G	H
2	3	4	12	10

Elementi septimi finis.



ΕΥΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ὄΓΔΟΟΝ.

EVCLIDIS ELEMENTVM OCTAVVM.

α

Ἐὰν ὦσιν ὁσοιδηποτοῦν ἀριθμοὶ ἑξῆς ἀνάλογον, οἱ δὲ ἄκροι αὐτῶν πρῶτοι πρὸς ἀλλήλους ὦσιν, ἐλάχιστοί εἰσι τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς.

Theor.1.Propo.1.

Si ſint quotcunque numeri deinceps proportionales, quorũ extremi ſint inter ſe primi, minimi ſunt omnium eandem cum eis rationem habentium.

A	B	C	D	E	F	G	H
8	12	18	27	6	8	12	18

β

Ἀριθμοὺς εὑρεῖν ἑξῆς ἀνάλογον ἐλαχίστους, ὅσους ἂν ἐπιτάξῃ τὶς ἐν τῷ δοθέντι λόγῳ.

Probl.1.Propo.2.

Numeros reperire deinceps porportionales minimos, quotcũque iusserit quispiam in data ratione.

A	B	C	D	E	F	G	H	K
3	4	9	12	16	27	36	49	64

γ

Ἐὰν ὦσιν ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον ἐλάχιστοι τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς, οἱ ἄκροι αὐτῶν πρῶτοι πρὸς ἀλλήλους εἰσίν.

Theor.2. Prop.3.Conuersa primæ.

Si sint quotcunque numeri dinceps proportionales minimi habentium eandem cum eis rationem, illorum extremi sunt inter se primi.

A	B	C	D	E	F	G	H	K	L	M	N	O
27	36	48	64	3	4	9	12	16	27	36	48	64

δ

Λόγων δοθέντων ὁποσωνοῦν ἐν ἐλαχίστοις ἀριθμοῖς, ἀριθμοὺς εὑρεῖν ἑξῆς ἐλαχίστους ἐν τοῖς δοθεῖσι λόγοις.

Pro-

Proble. 2. Propo. 4.

Rationibus datis quotcunque in minimis numeris reperire numeros deinceps minimos in datis rationibus.

A	B	C	D	E	F	H	G	K	L	N	X	M	O
3	4	2	3	4	5	6	8	12	15	4	6	10	12

ϛ

Οἱ ἐπίπεδοι ἀριθμοὶ πρὸς ἀλλήλους λόγον ἔχουσι τὸν συγκείμενον ἐκ τῶν πλευρῶν.

Theor. 3. Propo. 5.

Plani numeri rationem inter ſe habent ex lateribus compoſitam.

A	L	B	C	D	E	F	G	H	K
18	22	32	3	6	4	8	9	12	16

ζ

Ἐὰν ὦσιν ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον, ὁ δὲ πρῶτος τὸν δεύτερον μὴ μετρῇ, οὐδὲ εἷς ἄλλος οὐδένα μετρήσει.

Theor.4.Propo.6.

Si ſint quotlibet numeri deinceps proportionales, primus autem ſecundum non metiatur, neque alius quiſquam vllum metietur.

A	B	C	D	E	F	G	H
16	24	36	54	82	4	6	9

ζ

ἐὰν ὦσιν ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον, ὁ δὲ πρῶτος τὸν ἔσχατον μετρεῖ, καὶ τὸν δεύτερον μετρήσει.

Theor.8.propo.7.

Si ſint quotcunque numeri deinceps proportionales, primus autem extremum metiatur, is etiã ſecundum metietur.

A	B	C	D
4	6	12	24

η

ἐὰν δύο ἀριθμῶν μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπίπτωσιν ἀριθμοί, ὅσοι εἰς αὐτοὺς μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπίπτουσιν ἀριθμοί, τοσοῦτοι καὶ εἰς τοὺς τὸν αὐτὸν λόγον ἔχοντας αὐτοῖς μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπεσοῦνται.

Theor.6. Propo.8.

Si inter duos numeros medii continua

proportione incidant numeri, quot inter eos medii continua proportione incidunt numeri, tot & inter alios eandem cum illis habentes rationem medii continua proportione incident.

A	C	D	B	G	H	K	L	C	M	N	F
4	9	27	81	1	3	9	27	2	6	18	54

θ

Ἐὰν δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσι, καὶ εἰς αὐτῶν μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπίπτωσιν ἀριθμοί, ὅσοι εἰς αὐτῶν μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπίπτουσιν ἀριθμοί, τοσοῦτοι καὶ ἑκατέρου αὐτῶν καὶ μονάδος ἑξῆς μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπεσοῦνται.

Theor. 7. Propo. 9.

Si duo numeri ſint inter ſe primi, & inter eos medii continua proportione incidant numeri, quot inter illos medii cõtinua proportione incidunt numeri, totidem & inter vtrunque eorum ac vnitatem deinceps medii continua proportione incident.

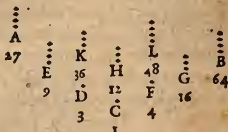
A	M	H	E	F	N	C	K	X	G	D	L	O	B
27	27	9	36	3	36	1	12	48	4	48	16	64	64

ι

ἐὰν δύο ἀριθμῶν καὶ μονάδος μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπίπτωσιν ἀριθμοί, ὅσοι ἑκατέρου αὐτῶν καὶ μονάδος ἑξῆς μεταξὺ κατὰ τὸ συνεχὲς ἀνάλοχον ἐμπίπτουσιν ἀριθμοί, τοσοῦτοι καὶ εἰς αὐτοὺς μεταξὺ κατὰ τὸ συνεχὲς ἀνάλογον ἐμπεσοῦνται.

Theor.8. Propo.10.

Si inter duos numeros & vnitatē continuè proportionales incidant numeri; quot inter vtrūque ipſorum & vnitatē deinceps medii continua proportione incidūt numeri, totidem & inter illos medii continua proportione incident.



ια

δύο τετραγώνων ἀριθμῶν εἷς μέσος ἀνάλογός ἐστιν ἀριθμός. καὶ ὁ τετράγωνος πρὸς τὸν τετράγωνον διπλασίονα λόγον ἔχει, ἤπερ ἡ πλευρὰ πρὸς τὴν πλευράν.

Theor.9. Propo.11.

Duorum quadratorum numerorū vnus medius proportionalis eſt numerus: &

quadratus ad quadratum duplicatam habet lateris ad latus rationem.

A	C	E	D	B
9	3	12	4	16

ιβ

Δύο κύβων ἀριθμῶν δύο ἀνάλογόν εἰσιν ἀριθμοί. καὶ ὁ κύβος πρὸς τὸν κύβον τριπλασίονα λόγον ἔχει, ἤπερ ἡ πλευρὰ πρὸς τὴν πλευράν.

Theor.10.Propo.12.

Duorum cuborum numerorum duo medii proportionales sunt numeri: & cubus ad cubum triplicatam habet lateris ad latus rationem.

A	H	K	B	C	D	E	F	G
27	36	48	64	3	4	9	12	16

ιγ.

Ἐὰν ὦσιν ὁσοιδηποτοῦν ἀριθμοὶ ἑξῆς ἀνάλογον, καὶ πολλαπλασιάσας ἕκαστος ἑαυτὸν ποιῇ τινὰς, οἱ γενόμενοι ἐξ αὐτῶν ἀνάλογον ἔσονται. καὶ ἐὰν οἱ ἐξ ἀρχῆς τοὺς γινομένους πολλαπλασιάσαντες ποιῶσι τινὰς, καὶ αὐτοὶ ἀνάλογον ἔσονται, καὶ ἀεὶ περὶ τοὺς ἄκρους τοῦτο συμβαίνει.

Theor. 11. Propo. 13.

Si sint quotlibet numeri deinces proportionales, & multiplicãs quisque seipsum

faciat aliquos, qui ab illis producti fuerint proportionales erunt: & si numeri primum positi, ex suo in procreatos ductu faciant aliquos, ipsi quoque proportionales erunt.



ιδ

Ἐὰν τετράγωνος τετράγωνον μετρῇ, καὶ ἡ πλευρὰ τὴν πλευρὰν μετρήσει. καὶ ἐὰν ἡ πλευρὰ τὴν πλευρὰν μετρῇ, καὶ ὁ τετράγωνος τὸν τετράγωνον μετρήσει.

Theor.12.Propo.14.

Si quadratus numerus quadratum numerum metiatur, & latus vnius metietur latus alterius. Et si vni⁹ quadrati latus metiatur latus alterius, & quadratus quadratum metietur.

A	E	B	C	D
9	12	16	3	4

ιε

Ἐὰν κύβος ἀριθμὸς κύβον ἀριθμὸν μετρῇ, καὶ ἡ πλευρὰ τὴν πλευρὰν μετρήσει. καὶ ἐὰν ἡ πλευρὰ τὴν πλευρὰν μετρῇ, καὶ ὁ κύβος τὸν κύβον μετρήσει.

Theor.13.Propo.15.

Si cubus numerus cubum numerũ metiatur, & latus vnius metietur alterius latus. Et si latus vnius cubi latus alterius metiatur, tum cubus cubum metietur.

A	H	K	B	C	D	E	F	G
8	16	28	64	2	4	4	8	16

ις

Ἐὰν τετράγωνος ἀριθμὸς τετράγωνον ἀριθμὸν μὴ μετρῇ, οὐδὲ ἡ πλευρὰ τὴν πλευρὰν μετρήσει, κἂν ἡ πλευρὰ τὴν πλευρὰν μὴ μετρῇ, οὐδὲ ὁ τετράγωνος τὸν τετράγωνον μετρήσει.

Theor.14.Propo.16.

Si quadratus numerus quadratũ numerum nõ metiatur, neque latus vnius metietur alterius latus. Et si latus vnius quadrati non metiatur latus alterius, neque quadratus quadratum metietur.

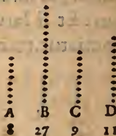
A	B	C	D
9	16	3	4
K	iiii		

ιζ

Ἐὰν κύβος ἀριθμὸς κύβον ἀριθμὸν μὴ μετρῇ, οὐδ' ἡ πλευρὰ τὴν πλευρὰν μετρήσει. κἂν ἡ πλευρὰ τὴν πλευρὰν μὴ μετρῇ, οὐδ' ὁ κύβος τὸν κύβον μετρήσει.

Theor.15.Propo.17.

Si cubus numerus cubum numerum nõ metiatur, neq; latus vnius latus alterius metietur. Et si latus cubi alicuius latus alterius nõ metiatur, neque cubus cubum metietur.

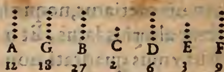


ιη

Δύο ὁμοίων ἐπιπέδων ἀριθμῶν εἷς μέσος ἀνάλογός ἐστιν ἀριθμός· καὶ ὁ ἐπίπεδος πρὸς τὸν ἐπίπεδον διπλασίονα λόγον ἔχει, ἤπερ ἡ ὁμόλογος πλευρὰ πρὸς τὴν ὁμόλογον πλευράν.

Theor.16.Propo.18.

Duorum similium planorum numerorũ vnus medius proportionalis est numerus: & planus ad planum duplicatam habet lateris homologi ad latus homologum rationem.



ιθ

Δύο ὁμοίων στερεῶν ἀριθμῶν δύο μέσοι ἀνάλογον ἐμπίπτουσιν ἀριθμοί. καὶ ὁ στερεὸς πρὸς τὸν ὅμοιον στερεὸν τριπλασίονα λόγον ἔχει, ἤπερ ἡ ὁμόλογος πλευρὰ πρὸς τὴν ὁμόλογον πλευράν.

Theor.17.Propo.19.

Inter duos similes numeros solidos, duo medii proportionales incidunt numeri. & solidus ad similem solidum triplicatã rationem habet lateris homologi ad latus homologum.

A	N	X	B	C	D	E	F	G	H	K	M	L
8	12	18	27	2	2	2	3	3	3	4	6	9

κ

Ἐὰν δύο ἀριθμῶν εἷς μέσος ἀνάλογον ἐμπίπτῃ ἀριθμός, ὅμοιοι ἐπίπεδοι ἔσονται ἀριθμοί.

Theor.18.Propo.20.

Si inter duos numeros vnus medius proportionalis incidat numerus, similes plani erunt illi numeri.

A	C	B	D	E	F	G
18	24	32	3	4	6	8

κα

Ἐὰν δύο ἀριθμῶν δύο μέσοι ἀνάλογον ἐμπίπτωσιν ἀριθμοί, ὅμοιοι στερεοί εἰσιν οἱ ἀριθμοί.

Theor.19.Propo.21.

Si inter duos numeros duo medii proportionales incidant numeri, similes solidi sunt illi numeri.

A	C	D	B	E	F	G	H	K	L	M
27	36	44	64	9	12	16	3	3	3	4

κβ

Ἐὰν τρεῖς ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ δὲ πρῶτος τετράγωνος ᾖ, καὶ ὁ τρίτος τετράγωνος ἔσται.

Theor.20.Propo.22.

Si tres numeri deinceps sint proportionales, primus autem sit quadratus, & tertius quadratus erit.

A	B	D
9	15	25

κγ

Ἐὰν τέσσαρες ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ δὲ πρῶτος κύβος ᾖ, καὶ ὁ τέταρτος κύβος ἔσται.

Theor.21.propo.23.

Si quatuor numeri deinceps sint porportionales, primus autem sit cubus, & quartus cubus erit.

A	B	C	D
8	12	18	27

κδ

Ἐὰν δύο ἀριθμοὶ πρὸς ἀλλήλους λόγον ἔχωσιν ὃν τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν, ὁ δὲ πρῶτος τετράγωνος ᾖ, καὶ ὁ δεύτερος τετράγωνος ἔσται.

Theor.22.Propo.24.

Si duo numeri rationem habeāt inter ſe quā quadratus numerus ad quadratū numerū, primus autē ſit quadratus,& ſecūdus quadratus erit.

A		B	C		D
4	6	9	16	24	36

κε

Ἐὰν δύο ἀριθμοὶ πρὸς ἀλλήλους λόγον ἔχωσιν, ὃν κύβος ἀριθμὸς πρὸς κύβον ἀριθμόν, ὁ δὲ πρῶτος κύβος ᾖ, καὶ ὁ δεύτερος κύβος ἔσται.

Theor.23.Propo.25.

Si numeri duo rationem inter ſe habeāt quam cubus numerus ad cubum numerum, primus autem cubus ſit,& ſecundus cubus erit.

A	E	F	B	C			D
8	12	18	27	64	95	140	216

κϛ

οἱ ὅμοιοι ἐπίπεδοι ἀριθμοὶ πρὸς ἀλλήλους λόγον ἔχουσιν, ὃν τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν.

Theor.24.Propo.26.

Similes plani numeri rationem inter se habẽt, quã quadratus numerus ad quadratũ numerum.

A	C	B	D	E	F
18	24	32	9	12	16

κζ

οἱ ὅμοιοι στερεοὶ ἀριθμοὶ πρὸς ἀλλήλους λόγον ἔχουσιν, ὃν κύβος ἀριθμὸς πρὸς κύβον ἀριθμόν.

Theor.25.Propo.27.

Similes solidi numeri rationem habent inter se, quam cubus numerus ad cubũ numerum.

A	C	D	B	E	F	G	H
16	24	36	54	8	12	18	27

Elementi octaui finis.



ἘΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕῖΟΝ
ἔΝΝΑΤΟΝ.

EVCLIDIS ELEMENTVM NONVM.

α.

Ἐὰν δύο ὅμοιοι ἐπίπεδοι ἀριθμοὶ πολλαπλασιάσαντες ἀλλήλους ποιῶσί τινα, ὁ γενόμενος τετράγωνος ἔσται.

Theor.1.Prop.1.

Si duo ſimiles plani numeri mutuò ſeſe multiplicantes quendam procreent, productus quadratus erit.

A	E	B	D		C
4	6	9	16	24	36

β

Ἐὰν δύο ἀριθμοὶ πολλαπλασιάζοντες ἀλλήλους ποιῶσι τετράγωνον, ὅμοιοι ἐπίπεδοί εἰσι.

Theor.2.Propo.2.

Si duo numeri mutuò ſeſe multiplicantes quadratum faciant, illi ſimiles ſunt plani.

A		B	D		C
4	6	12	9	18	36

γ

Ἐὰν κύβος ἀριθμὸς ἑαυτὸν πολλαπλασιάσας ποιῇ τινά, ὁ γενόμενος κύβος ἔσται.

Theor.3.Propo.3.

Si cubus numerus ſeipſum multiplicãs procreet aliquem, productus cubus erit.

Vnitas.	D	D	A			B
	3	4	8	16	32	64

δ

Ἐὰν κύβος ἀριθμὸς κύβον ἀριθμὸν πολλαπλασιάσας ποιῇ τινά, ὁ γενόμενος κύβος ἔσται.

Theor.4.Propo.4.

Si cubus numerus cubũ numerum multiplicans quendam procreet, procreatus cubus erit.

A	B	D	C
8	27	64	216

ε

Ἐὰν κύβος ἀριθμὸς ἀριθμόν τινα πολλαπλασιάσας κύβον ποιῇ, καὶ ὁ πολλαπλασιασθεὶς κύβος ἔσται.

Theor.5.Propo.5.

Si cubus numerus numerum quendam multiplicãs cubum procreet, & multiplicatus cubus erit.

A	B	D	C
27	64	729	1728

ς

Ἐὰν ἀριθμὸς ἑαυτὸν πολλαπλασιάσας κύβον ποιῇ, καὶ αὐτὸς κύβος ἔσται.

Theor.6.Propo.6.

Si numerus ſeipſum multiplicans cubum procreet, & ipſe cubus erit.

A	B	C
27	729	19683

ζ

Ἐὰν σύνθετος ἀριθμὸς ἀριθμόν τινα πολλαπλασιάσας ποιῇ τινα, ὁ γενόμενος στερεὸς ἔσται.

Theor.7.Propo.7.

Si compoſitus numerus quendam numerum multiplicans quempiam procreet, productus ſolid⁹ erit.

A	B	C	D	E
6	8	48	2	3

η

Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ μὲν τρίτος ἀπὸ τῆς μονάδος τετράγωνός ἐστι, καὶ οἱ ἕνα διαλείποντες πάντες, ὁ δὲ τέταρτος κύβος, καὶ οἱ δύο διαλείποντες πάντες, ὁ δὲ ἕβδομος κύβος ἅμα καὶ τετράγωνος, καὶ οἱ πέντε διαλείποντες πάντες.

Theor.8.Propo.8.

Si ab vnitate quotlibet numeri deinceps proportionales ſint, tertius ab vnitate quadratus eſt, & vnũ intermittentes omnes: quartus autẽ cubus, & duobus intermiſsis omnes: ſeptimus verò cubus ſimul & quadratꝰ, & quinque intermiſsis omnes.

Vnitas.	A	B	C	D	E	F
	3	9	27	81	243	729

θ

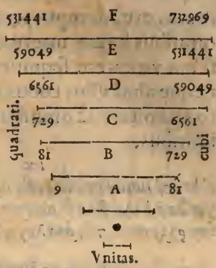
Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ δὲ μετὰ τὴν μονάδα τετράγωνος ᾖ, καὶ οἱ λοιποὶ πάντες τετράγωνοι ἔσονται. καὶ ἐὰν ὁ μετὰ τὴν μονάδα κύβος ᾖ, καὶ οἱ λοιποὶ πάντες κύβοι ἔσονται.

Theor.9.Propo.9.

Si ab vnitate ſint quotcũque numeri deinceps proportionales, ſit autem quadratus

dratus

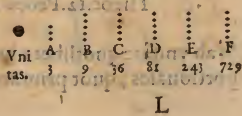
dratus is qui vnitatē sequitur, & reliqui omnes quadrati erunt. Quòd si qui vnitatem sequitur cubus sit, & reliqui omnes cubi erunt.



Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἀνάλογον ὦσιν, ὁ δὲ μετὰ τὴν μονάδα μὴ ᾖ τετράγωνος, οὐδ' ἄλλος οὐδεὶς τετράγωνος ἔσται, χωρὶς τοῦ τρίτου ἀπὸ τῆς μονάδος καὶ τῶν ἕνα διαλειπόντων πάντων. καὶ ἐὰν ὁ μετὰ τὴν μονάδα κύβος μὴ ᾖ, οὐδ' ἄλλος οὐδεὶς κύβος ἔσται, χωρὶς τοῦ τετάρτου ἀπὸ τῆς μονάδος καὶ τῶν δύο διαλειπόντων πάντων.

Theor. 10. Propo. 10.

Si ab vnitate numeri quotcunque proportionales sint, non sit autem quadratus is qui vnitatem sequitur, neque alius vllus qua-



dratus erit, demptis tertio ab vnitate ac omnibus vnum intermittẽtibus. Quòd si qui vnitatem sequitur cubus non sit, neque alius vllus cubus erit, dẽptis quarto ab vnitate ac omnibus duos intermittentibus.

ια

Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ ἐλάττων τὸν μείζονα μετρεῖ κατά τινα τῶν ὑπαρχόντων ἐν τοῖς ἀνάλογον ἀριθμοῖς.

Theor.11.Propo.11.

Si ab vnitate numeri quotlibet deinceps proportionales sint, minor maiorẽ metitur per quempiam eorũ qui ĩ proportionalib⁹ sunt numeris.

A D C D E
1 2 4 8 16

ιβ

Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἀνάλογον ὦσιν, ὑφ' ὅσων ἂν ὁ ἔσχατος πρώτων ἀριθμῶν μετρῆται, ὑπὸ τῶν αὐτῶν καὶ ὁ παρὰ τὴν μονάδα μετρηθήσεται.

Theor.12.Propo. 12.

Si ab vnitate quotlibet numeri sint proportionales, quot primorum numerorũ

vltimum metiuntur, totidem & eum qui vnitati proximus eſt, metientur.

Vnitas.	A	B	C	D	E	H	G	F
	4	16	64	259	2	8	32	128

ιγ

Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν, ὁ δὲ μετὰ τὴν μονάδα πρῶτος ᾖ, ὁ μέγιστος ὑπ᾽ οὐδενὸς ἄλλου μετρηθήσεται παρὲξ τῶν ὑπαρχόντων ἐν τοῖς ἀνάλογον ἀριθμοῖς.

Theor. 13. Propoſi. 13.

Si ab vnitate ſint quotcũque numeri deinceps proportionales, primus autem ſit qui vnitatem ſequitur, maximum nullus alius metietut, iis exceptis qui in proportionalibus ſunt numeris.

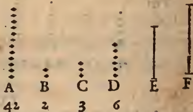
Vnitas.	A	B	C	D	E	H	G	Y
	3	9	27	81				

ιδ

Ἐὰν ἐλάχιστος ἀριθμὸς ὑπὸ πρώτων ἀριθμῶν μετρῆται, ὑπ᾽ οὐδενὸς ἄλλου ἀριθμοῦ μετρηθήσεται παρὲξ τῶν ἐξ ἀρχῆς μετρούντων.

Theor.14.Propo.14.

Si minimum numerum primi aliquot numeri metiantur, nullus alius numerus primus illum metietur, iis exceptis qui primò metiuntur.

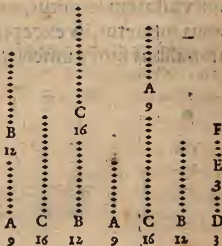


ιε

Ἐὰν τρεῖς ἀριθμοὶ ἑξῆς ἀνάλογον ὦσιν ἐλάχιστοι τῶν τὸν αὐτὸν λόγον ἐχόντων αὐτοῖς, δύο ὁποιοῦν συντεθέντες πρὸς τὸν λοιπὸν πρῶτοί εἰσιν.

Theor.15.Propo.15.

Si tres numeri deinceps proportionales sint minimi eandẽ cũ ipsis habentiũ rationẽ, duo quilibet compositi ad tertium primi erunt.



ιϛ

ἐὰμ δύο ἀριθμοὶ πρῶτοι πρὸς ἀλλήλους ὦσιμ, οὐκ ἔσται ὡς ὁ πρῶτος πρὸς τὸν δεύτερομ, οὕτως ὁ δεύτερος πρὸς ἄλλομ τινά.

Theor.16.Propo.16.

Si duo numeri ſint inter ſe primi, non ſe habebit quemadmodum primus ad ſecundum, ita ſecundus ad quempiam alium.

A B C
5 8

ιζ

ἐὰμ ὦσιμ ὁσοιδηποτοῦμ ἀριθμοὶ ἑξῆς ἀνάλογομ, οἱ δὲ ἄκροι αὐτῶν πρῶτοι πρὸς ἀλλήλους ὦσιμ, οὐκ ἔσται ὡς ὁ πρῶτος πρὸς τὸν δεύτερομ, οὕτως ὁ ἔσχατος πρὸς ἄλλομ τινά.

Theor.17.Propo.17.

Si ſint quotlibet numeri deinceps proportionales, quorum extremi ſint inter ſe primi, nõ erit quemadmodum primus ad ſecũdum, ita vltimus ad quempiam alium.

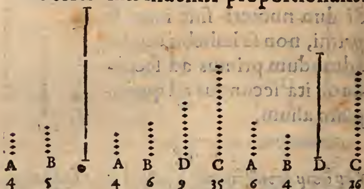
A B C D E
8 12 16 27

ιη

Δύο ἀριθμῶν δοθέντων, ἐπισκέψασθαι εἰ δυνατόν ἐστιν αὐτοῖς τρίτον ἀνάλογον προσευρεῖν.

Theor.18.Propo.18.

Duobus numeris datis, considerare possítne terti⁹ illis inueniri proportionalis.

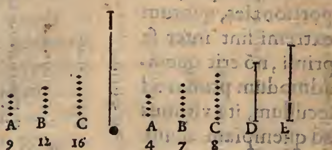


ιθ

Τριῶν ἀριθμῶν δοθέντων, ἐπισκέψασθαι εἰ δυνατόν ἐστιν αὐτοῖς τέταρτον ἀνάλογον προσευρεῖν.

Theor.9.Propo.19.

Tribus numeris datis, cõsiderare possítne quartus illis reperiri proportionalis.

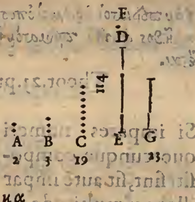


ιη.

οἱ πρῶτοι ἀριθμοὶ πλείους εἰσὶ παντὸς τοῦ προτεθέντος πλήθους πρώτων ἀριθμῶν.

Theor.20.Propo.20.

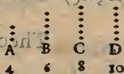
Primi numeri plures sunt quacunque proposita multitudine primorum numerorum.



ἐὰν ἄρτιοι ἀριθμοὶ ὁποσοιοῦν συντεθῶσιν, ὁ ὅλος ἄρτιός ἐστι.

Theor. 21. Propo.21.

Si pares numeri quotlibet compositi sint, totus est par.



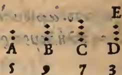
κα.

ἐὰν περισσοὶ ἀριθμοὶ ὁποσοιοῦν συντεθῶσι, τὸ δὲ πλῆθος αὐτῶν ἄρτιον ᾖ, ὅλος ἄρτιος ἔσται.

Theor.22. Propo.22.

Si impares numeri quotlibet compositi

ſint, ſit autem par il-
lorum multitudo, to-
tus par erit.

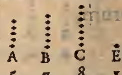


κγ

Ἐὰν περισσοὶ ἀριθμοὶ ὁποσοιοῦν συντεθῶσιν, τὸ δὲ πλῆθος αὐτῶν περισσὸν ᾖ, καὶ ὅλος περισσὸς ἔσται.

Theor.23.propo.23.

Si impares numeri quotcunque compoſiti ſint, ſit autē impar illorum multitudo, & totus impar erit.

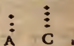


κδ

Ἐὰν ἀπὸ ἀρτίου ἀριθμοῦ ἄρτιος ἀφαιρεθῇ, καὶ ὁ λοιπὸς ἄρτιός ἔσται.

Theor.24.Propo.24.

Si de pari numero par detractus ſit, & reliquus par erit.



κε

Ἐὰν ἀπὸ ἀρτίου ἀριθμοῦ περισσὸς ἀφαιρεθῇ, καὶ ὁ λοιπὸς περισσὸς ἔσται.

Theor.25. Propo.25.

Si de pari numero impar detractus sit, & reliquus impar erit.

B
A C D
8 1 4

κϛ

Ἐὰν ἀπὸ περισσοῦ ἀριθμοῦ περισσὸς ἀφαιρεθῇ, καὶ ὁ λοιπὸς ἄρτιος ἔσται.

Theor.26. Propo.26.

Si de impari numero impar detractus sit, & reliquus par erit.

B
A C D
4 6 1

κζ

Ἐὰν ἀπὸ περισσοῦ ἀριθμοῦ ἄρτιος ἀφαιρεθῇ, ὁ λοιπὸς περισσὸς ἔσται.

Theor.27. Propo.27.

Si ab impari numero par ablatus sit, reliquus impar erit.

B
A D C
1 4 4

κη

Ἐὰν περισσὸς ἀριθμὸς ἄρτιον πολλαπλασιάσας ποιῇ τινά, ὁ γενόμενος ἄρτιος ἔσται.

Theor.28.Propo.28.

Si impar numerus parē multiplicans procreet quempiā, procreatus par erit.

A B C
3 4 12

κθ

Ἐὰν περισσὸς ἀριθμὸς περισσὸν ἀριθμὸν πολλαπλασιάσας ποιῇ τινὰ, ὁ γενόμενος περισσὸς ἔσται.

Theor.29.Propo.29.

Si impar numerus imparē numerū multiplicās quēdā procreet, procreatus impar erit.

A B C
3 5 15

λ

Ἐὰν περισσὸς ἀριθμὸς ἄρτιον ἀριθμὸν μετρῇ, καὶ τὸ ἥμισυ αὐτοῦ μετρήσει.

Theor.30.Propo.30.

Si impar numerus parem numerum metiatur, & illius dimidium metietur.

A C B
3 6 18

λα

Ἐὰν περισσὸς ἀριθμὸς πρός τινα ἀριθμὸν πρῶτος ᾖ, καὶ πρὸς τὸν διπλάσιον αὐτοῦ πρῶτος ἔσται.

Theor.31.Propo.31.

Si impar numerus ad numerum quēpiam primus sit, & ad illius duplum primus erit.

A B C D
7 8 16

λβ

Τῶν ἀπὸ δυάδος διπλασιαζομένων ἀριθμῶν ἕκαστος ἀρτιάκις ἄρτιός ἐστι μόνον.

Theor.32.Prop.32.

Numerorũ, qui à binario dupli ſunt, vnuſquiſque pariter par eſt tantùm.

Vnitas. A 2 B 4 C 8 D 16

λγ

Ἐὰν ἀριθμὸς τὸ ἥμισυ ἔχῃ περισσόν, ἀρτιάκις περισσός ἐστι μόνον.

Theor.33. Propo.33.

Si numerus dimidium impar habeat, pariter impar eſt tantum.

A 20

λδ

Ἐὰν ἄρτιος ἀριθμὸς μήτε τῶν ἀπὸ δυάδος διπλασιαζομένων ᾖ, μήτε τὸ ἥμισυ ἔχῃ περισσόν, ἀρτιάκις τε ἄρτιός ἐστι καὶ ἀρτιάκις περισσός.

Theor.34.Propo.34.

Si par numerus nec ſit duplus à binario, nec dimidiũ impar habeat, pariter par eſt & pariter impar.

A 10

λε

Ἐὰν ὦσιν ὁποσοιδηποτοῦν ἀριθμοὶ ἑξῆς ἀνάλογον, ἀφαιρεθῶσι δὲ ἀπό τε τοῦ δευτέρου καὶ τοῦ ἐσχάτου ἴσοι τῷ πρώτῳ, ἔσται ὡς ἡ τοῦ δευτέρου ὑπεροχὴ πρὸς τὸν πρῶτον, οὕτως ἡ τοῦ ἐσχάτου ὑπεροχὴ πρὸς τοὺς πρὸ ἑαυτοῦ ἅπαντας.

Theor.35. Propo.35.

Si ſint quotlibet numeri deinceps proportionales, detrahãtur autem de ſecundo & vltimo æquales ipſi primo, erit quemadmodum ſecundi exceſſus ad primum, ita vltimi exceſſus ad omnes qui vltimum antecedunt.

F
4
K
4
C
4
G
D B D E
4 4 16 16

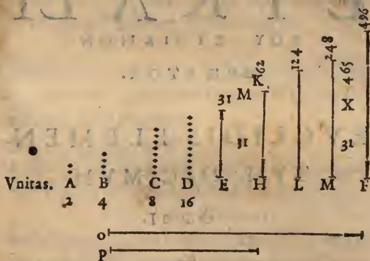
λϛ

Ἐὰν ἀπὸ μονάδος ὁποσοιοῦν ἀριθμοὶ ἑξῆς ἐκτεθῶσιν ἐν τῇ διπλασίονι ἀναλογίᾳ, ἕως οὗ ὁ σύμπας συντεθεὶς πρῶτος γένηται, καὶ ὁ σύμπας ἐπὶ τὸν ἔσχατον πολλαπλασιασθεὶς ποιῇ τινα, ὁ γενόμενος τέλειος ἔσται.

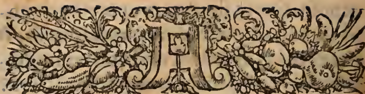
Theor.36. Propo.36.

Si ab vnitate numeri quotlibet deinceps

expoſiti ſint in duplici proportione quoad totus compoſitus primus factus ſit, iſque totus in vltimum multiplicatus quẽpiã procreet, procreatus perfectus erit.



Elementi noni finis.



ΕΥΚΛΕΙ ΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ΔΕΚΑΤΟΝ.

EVCLIDIS ELEMENTVM DECIMVM.

ὅροι.

α

Σύμμετρα μεγέθη λέγεται, τὰ τῷ αὐτῷ μέτρῳ μετρούμενα.

DEFINITIONES.

I

Commenſurabiles magnitudines dicuntur illę, quas eadē menſura metitur.

β

Ἀσύμμετρα δέ, ὧν μηδὲν ἐνδέχεται κοινὸν μέτρον γενέσθαι.

2

Incommenſurabiles verò magnitudines dicuntur hæ, quarum nullam menſuram communem contingit reperiri.

γ

Εὐθεῖαι δυνάμει σύμμετροί εἰσιν, ὅταν τὰ ἀπ' αὐτῶν τετράγωνα τῷ αὐτῷ χωρίῳ μετρῆται.

3

Lineæ rectæ potentia commenſurabiles ſunt, quarum quadrata vna eadē ſuperficies ſiue area metitur.

δ

Ἀσύμμετροι δ', ὅταν τοῖς ἀπ' αὐτῶν τετραγώνοις μηδὲν ἐνδέχηται χωρίον κοινὸν μέτρον γενέσθαι.

4

Incōmenſurabiles verò lineæ ſunt, quarum quadrata, quæ metiatur area communis, reperiri nulla poteſt.

ε

Τούτων ὑποκειμένων, δείκνυται ὅτι τῇ προτεθείσῃ εὐθείᾳ ὑπάρχουσιν εὐθεῖαι πλήθει ἄπειροι, σύμμετροί τε καὶ ἀσύμμετροι, αἱ μὲν μήκει καὶ δυνάμει, αἱ δ' δυνάμει μόνον. Καλείσθω οὖν ἡ μὲν προτεθεῖσα εὐθεῖα ῥητή.

5

Hæc cū ita ſint, oſtēdi poteſt quòd quātacunque linea recta nobis proponatur,

existunt etiam aliæ lineæ innumerabiles eidem commensurabiles, aliæ item incõmensurabiles, hæ quidem longitudine & potentia: ~~ille~~ vero potentia tantùm. V cetur igitur linea recta, quantacunq proponatur, ῥητὴ, id est rationalis.

ha

5

Καὶ αἱ ταύτῃ σύμμετροι εἴτε μήκει καὶ δυνάμει, εἴτε δυνάμει μόνον, ῥηταί.

6

Lineæ quoque illi ῥητῇ commensurabiles siue lõgitudine & potẽtia, siue potentia tantum, vocentur & ipsæ ῥηταί, id est rationales.

ζ

Αἱ δὲ ταύτῃ ἀσύμμετροι, ἄλογοι καλείσθωσαν.

7

Quæ verò lineæ sunt incommensurabiles illi τῇ ῥητῇ, id est primo loco rationali, vocentur ἄλογοι, id est irrationales.

η

Καὶ τὸ μὲν ἀπὸ τῆς προτεθείσης εὐθείας τετράγωνον, ῥητόν.

8

Et quadratũ quod à linea proposita describitur quam ῥητὴν vocari voluimus, vocetur ῥητόν.

Καὶ τὰ

ϑ

καὶ τὰ τούτῳ σύμμετρα, ῥητά.

9

Et quæ ſunt huic commenſurabilia, vocentur ῥητά.

ι

τὰ δὲ τούτῳ ἀσύμμετρα, ἄλογα καλείσθω.

10

Quæ verò ſunt illi quadrato ῥητῷ ſcilicet incommenſurabilia, vocentur ἄλογα, id eſt ſurda.

ια

καὶ αἱ δυνάμεναι αὐτά, ἄλογοι. εἰ μὲν τετράγωνα εἴη, αὗται αἱ πλευραί. εἰ δὲ ἕτερα τινὰ εὐθύγραμμα, αἱ ἴσα αὐτοῖς τετράγωνα ἀναγράφουσαι.

11

Et lineæ quæ illa incommēſurabilia deſcribunt, vocentur ἄλογοι. Et quidem ſi illa incommenſurabilia fuerint quadrata, ipſa eorum latera vocabuntur ἄλογοι lineæ. quòd ſi quadrata quidem non fuerint, verùm aliæ quæpiam ſuperficies ſiue figuræ rectilineæ, tunc verò lineæ illæ quæ deſcribũt quadrata æqualia figuris rectilineis, vocentur ἄλογοι.

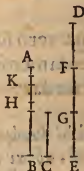
Πρότασις α.

Δύο μεγεθῶν ἀνίσων ἐκκειμένων, ἐὰν ἀπὸ τοῦ μεί-

ζον⊙ ἀφαιρεθῆ μεῖζον ἢ τὸ ἥμισυ, ϗ τοῦ καταλει-
πομένου μεῖζον ἢ τὸ ἥμισυ, ϗ τοῦτο ἀεὶ γίγνηται, λη-
φθήσεταί τι μέγεθος, ὃ ἔσται ἔλασσον ἐκκειμένου ἐ-
λάσσονος μεγέθους.

Theor. 1. Propo. 1.

Duabus magnitudinibus inęqualibus propositis, si de maiore detrahatur plus dimidio, & rursus de residuo iterum detrahatur plus dimidio, idque semper fiat: relinquetur quædam magnitudo minor altera minore ex duabus propositis.

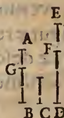


β

Ἐὰν δύο μεγεθῶν ἐκκειμένων ἀνίσων, ἀνθυφαιρουμένου ἀεὶ τοῦ ἐλάσσονος ἀπὸ τοῦ μείζονος, τὸ καταλειπόμενον μηδέποτε καταμετρῇ τὸ πρὸ ἑαυτοῦ, ἀσύμμετρα ἔσται τὰ μεγέθη.

Theor. 2. Propo. 2.

Duabus magnitudinibus propositis inæqualibus, si detrahatur semper minor de maiore, alterna quadã detractione, neque residuũ vnquam metiatur id quod



ante se metiebatur, incommensurabiles sunt illæ magnitudines.

γ

Δύο μεγεθῶν συμμέτρων δοθέντων, τὸ μέγιστον αὐτῶν κοινὸν μέτρον εὑρεῖν.

Plobl. 1. Propo. 3.

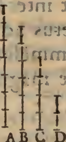
Duabus magnitudinibus commensurabilibus datis, maximam ipsarum communem mensuram reperire.

δ

Τριῶν μεγεθῶν συμμέτρων δοθέντων, τὸ μέγιστον αὐτῶν κοινὸν μέτρον εὑρεῖν.

Theor. 2. Propo. 4.

Tribus magnitudinibus cõmensurabilibus datis, maximam ipsarum communem mensuram reperire.

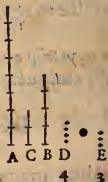


ε

Τὰ σύμμετρα μεγέθη πρὸς ἄλληλα λόγον ἔχει, ὃν ἀριθμὸς πρὸς ἀριθμόν.

Theor.3.Propo.5.

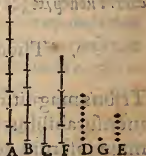
Commenſurabiles magnitudines inter ſe proportionem eam habẽt, quam habet numerus ad numerum.



Ἐὰν δύο μεγέθη πρὸς ἄλληλα λόγον ἔχει ὃν ἀριθμὸς πρὸς ἀριθμὸν, σύμμετρά ἐστι τὰ μεγέθη.

Theor.4.Propo.6.

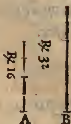
Si duæ magnitudines proportioné eam habẽt inter ſe quam numerus ad numerum, commẽſurabiles ſunt illæ magnitudines.



Τὰ ἀσύμμετρα μεγέθη πρὸς ἄλληλα λόγον οὐκ ἔχει, ὃν ἀριθμὸς πρὸς ἀριθμόν.

Theor.5.Propo.7.

Incommēſurabiles magnitudines inter ſe porportionem non habent, quam numerus ad numerum.

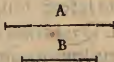


η

Ἐὰν δύο μεγέθη πρὸς ἄλληλα λόγον μὴ ἔχῃ ὃν ἀριθμὸς πρὸς ἀριθμόν, ἀσύμμετρα ἔσται τὰ μεγέθη.

Theor.6.Propo.8.

Si duæ magnitudines inter ſe proportionem nō habēt quam numerus ad numerum, incōmenſurabiles illæ ſunt magnitudines.



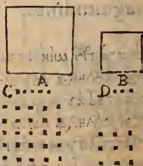
θ

Τὰ ἀπὸ τῶν μήκει συμμέτρων εὐθειῶν τετράγωνα, πρὸς ἄλληλα λόγον ἔχει ὃν τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν. καὶ τὰ τετράγωνα τὰ πρὸς ἄλληλα λόγον ἔχοντα ὃν τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν, καὶ τὰς πλευρὰς ἕξει μήκει συμμέτρους. τὰ δὲ ἀπὸ τῶν μήκει ἀσυμμέτρων εὐθειῶν τετράγωνα πρὸς ἄλληλα λόγον οὐκ ἔχει ὅνπερ τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν. καὶ τὰ τετράγωνα τὰ πρὸς ἄλληλα λόγον μὴ

ἔχοντα ὅνπερ τετράγωνος ἀριθμὸς πρὸς τετράγωνον ἀριθμόν, οὐδὲ τὰς πλευρὰς ἕξει μήκει συμμέτρους.

Theor.7.Propo.9.

Quadrata, quæ deſcribuntur à rectis lineis longitudine commenſurabilibus, inter ſe proportionem habent quam numerus quadratus ad alium numerũ quadratum. Et quadrata habẽtia proportionem inter ſe quam quadratus numerus ad numerum quadratum, habent quoque latera longitudine commenſurabilia. Quadrata verò quæ deſcribuntur à lineis longitudine incommenſurabilibus, proportionem nõ habent inter ſe quam quadratus numerus ad numerum alium quadratum. Et quadrata non habentia proportionem inter ſe quã numerus quadratus ad numerum quadratũ, neque latera habebunt longitudine commenſurabilia.

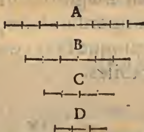


ι

Ἐὰν τέσσαρα μεγέθη ἀνάλογον ᾖ, τὸ δὲ πρῶτον τῷ δευτέρῳ σύμμετρον ᾖ, καὶ τὸ τρίτον τῷ τετάρτῳ σύμμετρον ἔσται. κἂν τὸ πρῶτον τῷ δευτέρῳ ἀσύμμετρον ᾖ, καὶ τὸ τρίτον τῷ τετάρτῳ ἀσύμμετρον ἔσται.

Theor. 8. Propo. 10.

Si quatuor magnitudines fuerint proportionales, prima verò secundæ fuerit commensurabilis, tertia quoq; quartæ commensurabilis erit. quòd si prima secundæ fuerit incommensurabilis, tertia quoque quartæ incommensurabilis erit.

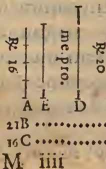


ια

Τῇ προτεθείσῃ εὐθείᾳ προσευρεῖν δύο εὐθείας ἀσυμμέτρους, τὴν μὲν μήκει μόνον, τὴν δὲ καὶ δυνάμει.

Proble. 3. Propo. 11.

Propositæ lineæ rectæ (quam ῥητὴν vocari diximus) reperire duas lineas rectas incommensurabiles, hanc quidem longitudne tantùm, il-



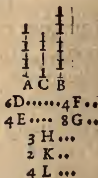
Iam verò non longitudine tantùm, sed etiam potentia incommensurabilem.

ιβ

Τὰ τῷ αὐτῷ μεγέθει σύμμετρα, καὶ ἀλλήλοις ἐστὶ σύμμετρα.

Theor.9.Prop.12.

Magnitudines quæ eidem magnitudini sunt commensurabiles, inter se quoque sunt commēsurabiles.

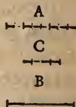


ιγ

Ἐὰν ᾖ δύο μεγέθη, καὶ τὸ μὲν σύμμετρον ᾖ τῷ αὐτῷ, τὸ δὲ ἕτερον ἀσύμμετρον, ἀσύμμετρα ἔσται τὰ μεγέθη.

Theor.10.Propo.13.

Si ex duabus magnitudinibus hæc quidem commēsurabilis sit tertiæ magnitudini, illa verò eidem incommensurabilis, incommensurabiles sunt illæ duæ magnitudines.



ιδ

Ἐὰν ᾖ δύο μεγέθη σύμμετρα, τὸ δὲ ἕτερον αὐτῶν

μεγέθει τινὶ ἀσύμμετρον ᾖ, καὶ τὸ λοιπὸν τῷ αὐτῷ ἀσύμμετρον ἔσται.

Theor.11.Propo.14.

Si duarũ magnitudinum commẽsurabilium altera fuerit incommensurabilis magnitudini alteri cuipiã tertiæ, reliqua quoque magnitudo eidem tertiæ incommẽsurabilis erit.

ιε

Ἐὰν τέσσαρες εὐθεῖαι ἀνάλογον ὦσιν, δύνηται δὲ ἡ πρώτη τῆς δευτέρας μεῖζον τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει, καὶ ἡ τρίτη τῆς τετάρτης μεῖζον δυνήσεται τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει. καὶ ἐὰν ἡ πρώτη τῆς δευτέρας μεῖζον δύνηται τῷ ἀπὸ ἀσυμμέτρου ἑαυτῇ μήκει, καὶ ἡ τρίτη τῆς τετάρτης μεῖζον δυνήσεται τῷ ἀπὸ ἀσυμμέτρου ἑαυτῇ μήκει.

Theor.12.Propo.15.

Si quatuor rectæ proportionales fuerint, poſsit autem prima pluſquam ſecunda tanto quantum eſt quadratum lineæ ſibi cõmenſurabilis longitudine: tertia quoque poterit pluſquam quarta tanto quã-tum eſt quadratum lineæ ſibi commen-

ſurabilis lõgitudine. Quòd ſi prima poſſit pluſquã ſecunda quadrato lineæ ſibi longitudine incommenſurabilis: tertia quoque poterit pluſquam quarta quadrato lineæ ſibi incommenſurabilis longitudine.

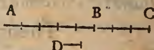


ιε

Ἐὰν δύο μεγέθη σύμμετρα συντεθῇ, καὶ τὸ ὅλον ἑκατέρῳ αὐτῶν σύμμετρον ἔσται. κἂν τὸ ὅλον ἑνὶ αὐτῶν σύμμετρον ᾖ, καὶ τὰ ἐξ ἀρχῆς μεγέθη σύμμετρα ἔσται.

Theor.13.Propo.16.

Si duæ magnitudines commenſurabiles componãtur, tota magnitudo compoſita ſingulis partibus commenſurabilis erit. quòd ſi tota magnitudo compoſita alterutri parti commẽſurabilis fuerit, illæ duæ quoque partes cõmenſurabiles erunt.

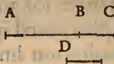


ιζ

Ἐὰν δύο μεγέθη ἀσύμμετρα συντεθῇ, καὶ τὸ ὅλον ἑκατέρῳ αὐτῶν ἀσύμμετρον ἔσται. κἂν τὸ ὅλον ἑνὶ αὐτῶν ἀσύμμετρον ᾖ, καὶ τὰ ἐξ ἀρχῆς μεγέθη ἀσύμμετρα ἔσται.

Theor. 14. Propo. 17.

Si duæ magnitudines incommenſurabiles componantur, ipſa quoque tota magnitudo ſingulis partibus componentibus incommẽſurabilis erit. Quòd ſi tota alteri parti incommenſurabilis fuerit, illæ quoque primæ magnitudines inter ſe incommenſurabiles erunt.



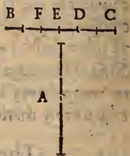
ιη

Ἐὰν ὦσι δύο εὐθεῖαι ἄνισοι, τῷ δὲ τετάρτῳ μέρει τοῦ ἀπὸ τῆς ἐλάσσονος ἴσον παραλληλόγραμμον παρὰ τὴν μείζονα παραβληθῇ ἐλλεῖπον εἴδει τετραγώνῳ, καὶ εἰς σύμμετρα αὐτὴν διαιρῇ μήκει, μείζων τῆς ἐλάσσονος μεῖζον δυνήσεται, τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει. καὶ ἐὰν ἡ μείζων τῆς ἐλάσσονος μεῖζον δύνηται, τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει, τῷ δὲ τετάρτῳ μέρει τοῦ ἀπὸ τῆς ἐλάσσονος ἴσον παραλληλόγραμμον παρὰ τὴν μείζονα παραβληθῇ ἐλλεῖπον εἴδει τετραγώνῳ, εἰς σύμμετρα αὐτὴν διαιρεῖ μήκει.

Theor. 15. Propo. 18.

Si fuerint duæ rectæ lineæ inæquales, & quartæ parti quadrati quod deſcribitur à minore, æquale parallelogrammũ ap-

plicetur ſecundum maiorem,ex qua maiore tantum excurrat extra latus parallelogrammi, quantum eſt alterum latus ipſius parallelogrammi:ſi prçterea parallelogrammum ſui applicatione diuidat lineam illam in partes inter ſe commenſurabiles longitudine, illa maior linea tãto plus poteſt quàm minor,quantum eſt quadratum lineæ ſibi commenſurabilis longitudine. Quòd ſi maior plus poſsit quàm minor, tãto quantum eſt quadratum lineæ ſibi commenſurabilis longitudine,& præterea quartæ parti quadrati lineæ minoris æquale parallelogrammũ applicetur ſecundum maiorem , ex qua maiore tantum excurrat extra latus parallelogrammi , quantũ eſt alterum latus ipſius parallelogrammi, parallelogrammum ſui applicatione diuidit maiorem in partes inter ſe lõgitudine commenſurabiles.



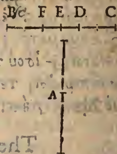
Ἐὰν ὦσι δύο εὐθεῖαι ἄνισοι, τῷ δὲ τετάρτῳ μέρει

τοῦ ἀπὸ τῆς ἐλάσσονος ἴσον παρὰ τὴν μείζονα παραβληθῇ ἐλλεῖπον εἴδει τετραγώνῳ, καὶ εἰς ἀσύμμετρα αὐτὴν διαιρῇ μήκει, ἡ μείζων τῆς ἐλάσσονος μεῖζον δυνήσεται, τῷ ἀπὸ ἀσυμμέτρου ἑαυτῇ. καὶ ἐὰν ἡ μείζων τῆς ἐλάσσονος μεῖζον δύνηται τῷ ἀπὸ ἀσυμμέτρου ἑαυτῇ, τῷ δὲ τετάρτῳ τοῦ ἀπὸ τῆς ἐλάσσονος ἴσον παρὰ τὴν μείζονα παραβληθῇ ἐλλεῖπον εἴδει τετραγώνῳ, εἰς ἀσύμμετρα αὐτὴν διαιρεῖ μήκει.

Theor.16.Propo.19.

Si fuerint duæ rectæ inæquales, quartæ autē parti quadrati lineæ minoris æquale parallelogrāmum ſecundum lineam maiorem applicetur, ex qua linea tantū excurrat extra latus parallelogrammi, quantum eſt alterum latus eiuſdem parallelogrammi: ſi parallelogrāmum præterea ſui applicatione diuidat lineam in partes inter ſe longitudine incommenſurabiles, maior illa linea tanto plus poteſt quàm minor, quantum eſt quadratum lineæ ſibi maiori incommenſurabilis longitudine. Quòd ſi maior linea tantò plus poſsit quàm minor, quantum eſt quadratum lineæ incommenſurabilis ſibi longitudine: & præterea quartæ parti

quadrati lineæ minoris æquale parallelogrammum applicetur secundum maiorem, ex qua tantum excurrat extra latus parallelogrammi, quantum est alterum latus ipsius: parallelogrãmũ sui applicatione diuidit maiorem in partes inter se incommensurabiles longitudine.

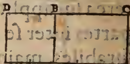


κ

Τὸ ὑπὸ ῥητῶν μήκει συμμέτρων κατά τινα τῶν προειρημένων τρόπων εὐθειῶν περιεχόμενον ὀρθογώνιον, ῥητόν ἐστιν.

Theor. 17. Propo. 20.

Superficies rectangula contenta ex lineis rectis rationalibus lõgitudine commensurabilibus secundum vnum aliquem modum ex antedictis, rationalis est.

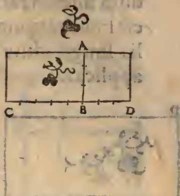


κα

Ἐὰν ῥητὸν παρὰ ῥητὴν παραβληθῇ, πλάτος ποιεῖ ῥητὴν καὶ σύμμετρον τῇ παρ' ἣν παράκειται, μήκει.

Theor.18.Propo.21.

Si rationale secūdum lineam rationalem applicetur, habebit alterum latus lineam rationalē & commensurabilem longitudine lineæ cui rationale parallelogrāmum applicatur.

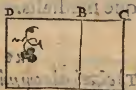


κβ

Τὸ ὑπὸ ῥητῶν δυνάμει μόνον συμμέτρων εὐθειῶν περιεχόμενον ὀρθογώνιον ἄλογόν ἐστι, καὶ ἡ δυναμένη αὐτὸ, ἄλογός ἐστι. καλείσθω δὲ μέση.

Theor.19.Proposi.22.

Superficies rectangula cōtenta duabus lineis rectis rationalibus potētia tantum cōmensurabilibus, irrationalis est. Linea autem quæ illam superficiem potest, irrationalis & ipsa est: vocetur verò medialis.

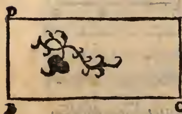


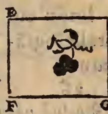
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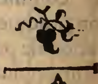
Τὸ ἀπὸ μέσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ ῥητὴν καὶ ἀσύμμετρον τῇ παρ' ἣν παράκειται, μήκει.

Theor.20.propo.23.

Quadrati lineæ medialis applicati ſecũdum lineam rationalem, alterum latus eſt linea rationalis,& incommenſurabilis longitudine lineæ ſecundum quam applicatur.





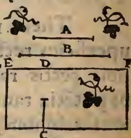


κδ

Ἡ τῇ μέσῃ σύμμετρος, μέση ἐστίν.

Theor.21.Propo.24.

Linea recta mediali commenſurabils,eſt ipſa quoque medialis.

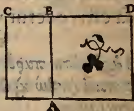


κε

Τὸ ὑπὸ μέσων μήκει συμμέτρων εὐθειῶν περιεχόμενον ὀρθογώνιον, μέσον ἐστίν.

Theor.22. Propo.25.

Parallelogrammũ rectangulum contentum ex lineis medialibus longitudine commẽſurabilibus, mediale eſt.



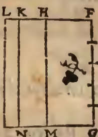
Τὸ ὑπὸ

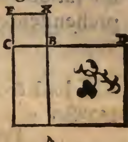
κς

Τὸ ἀπὸ μέσων δυνάμει μόνον συμμέτρων περιεχόμενον ὀρθογώνιον, ἤτοι ῥητὸν, ἢ μέσον ἐστίν.

Theor.23.Propo.26.

Parallelogrammum rectangulum comprehensum duab⁹ lineis medialib⁹ potentia tantùm commensurabilibus, vel rationale est, vel mediale.



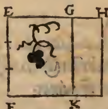


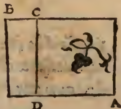
κζ

Μέσον μέσου οὐκ ὑπερέχει ῥητῷ.

Theor.24.Propo.27.

Mediale nō est maius quàm mediale superficie rationali.



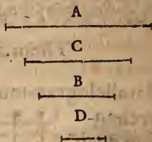


κη

Μέσας εὑρεῖν δυνάμει μόνον συμμέτρους, ῥητὸν περιεχούσας.

Probl.4.Propo.28.

Mediales lineas inuenire potentia tantùm commensurabiles rationale comprehendentes.

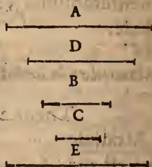


κθ

Μέσας εὑρεῖν δυνάμει μόνον συμμέτρους μέσον περιεχούσας.

Probl.5. Propo.29.

Mediales lineas inuenire potentia tantùm commensurabiles mediale comprehendentes.



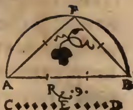
λ

Εὑρεῖν δύο ῥητὰς δυνάμει μόνον συμμέτρους, ὥστε τὴν μείζονα τῆς ἐλάττονος μεῖζον δύνασθαι τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει.

Probl.6.Propo.30.

Reperire duas rationales potentia tan-

tùm commēſurabiles huiuſmodi, vt maior ex illis poſsit plus quàm minor quadrato lineæ ſibi commēſurabilis longitudine.

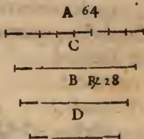


λα.

Εὑρεῖν δύο μέσας δυνάμει μόνον συμμέτρους ῥητὸν περιεχούσας, ὥστε τὴν μείζονα τῆς ἐλάσσονος μεῖζον δύνασθαι τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει.

Proble.7.Propo.31.

Reperire duas lineas mediales potentia tantum commenſurabiles rationalem ſuperficiem continentes, tales inquam, vt maior poſsit plus quàm minor quadrato lineæ ſibi commēſurabilis lōgitudine.



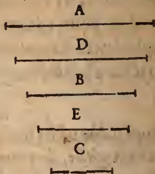
λβ

Εὑρεῖν δύο μέσας δυνάμει μόνον συμμέτρους μέσον περιεχούσας, ὥστε τὴν μείζονα τῆς ἐλάττονος μεῖζον δύνασθαι τῷ ἀπὸ συμμέτρου ἑαυτῇ.

Probl.8.Propo.32.

Reperire duas lines mediales potentia

tantum commēſurabiles medialē ſuperficiem continētes, huiuſmodi vt maior plus poſsit quā minor quadrato lineæ ſibi commenſurabilis longitudine.

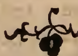


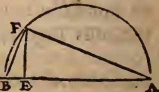
λγ

Εὑρεῖν δύο εὐθείας δυνάμει ἀσυμμέτρους, ποιούσας τὸ μὲν συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων ῥητόν, τὸ δ' ὑπ' αὐτῶν μέσον.

Probl.9.Propo.33.

Reperire duas rectas potentia incommēſurabiles, quarum quadrata ſimul addita faciant ſuperficiē rationalē, parallelogrammū verò ex ipſis contentum ſit mediale.



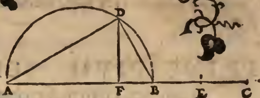


λδ

Εὑρεῖν δύο εὐθείας δυνάμει ἀσυμμέτρους, ποιούσας τὸ μὲν συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων μέσον, τὸ δ' ὑπ' αὐτῶν ῥητόν.

Probl.10.Propo.34.

Reperire lineas duas rectas potentia incommensurabiles, conficientes compositum ex ipsarũ quadratis mediale, parallelogrãmum verò ex ipsis contentum rationale.

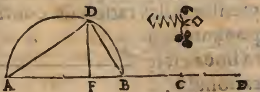


λε

Εὑρεῖν δύο εὐθείας δυνάμει ἀσυμμέτρους, ποιούσας τό, τε συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων μέσον, καὶ τὸ ὑπ' αὐτῶν μέσον, καὶ ἔτι ἀσύμμετρον τῷ συγκειμένῳ ἐκ τῶν ἀπ' αὐτῶν τετραγώνων.

Probl.11.Propo.35.

Reperire duas lineas rectas potentia incommensurabiles, conficientes id quod ex ipsarum quadratis componitur mediale, simúlque parallelogrammum ex ipsis cõtentũ, mediale, quod prętereà parallelogrãmũ sit incommensurabile composito ex quadratis ipsarum.



ἈΡΧῊ ΤΩ͂Ν ΚΑΤᾺ ΣΥ͂Ν-
θεσιν ἑξάδων.

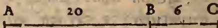
λϛ

Ἐὰν δύο ῥηταὶ δυνάμει μόνον σύμμετροι συντε-
θῶσιν, ἡ ὅλη ἄλογός ἐστιν. καλείσθω δὲ ἐκ δύο
ὀνομάτων.

PRINCIPIVM SENARIORUM per compositionem.

Theor.25.Propo.36.

Si duæ rationales potentia tantùm commensurabiles componãtur, tota linea erit irrationalis. Vocetur autem Binomium.



λζ

Ἐὰν δύο μέσαι δυνάμει μόνον σύμμετροι συντε-
θῶσι ῥητὸν περιέχουσαι, ἡ ὅλη ἄλογός ἐστι. καλεί-
σθω δὲ ἐκ δύο μέσων πρώτη.

Theor.26.Propo.37.

Si duæ mediales potentia tantùm commensurabiles rationale continentes cõponantur, tota linea est irrationalis.



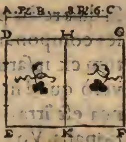
vocetur autem Bimediale prius.

λη

Ἐὰν δύο μέσαι δυνάμει μόνον σύμμετροι συντεθῶσι μέσον περιέχουσαι, ἡ ὅλη ἄλογός ἐστι. καλείσθω δὲ ἐκ δύο μέσων δευτέρα.

Theor.27.Propo.38.

Si duæ mediales potentia tantùm commensurabiles mediale cō tinentes componantur, tota linea eſt irrationalis. vocetur autem Bimediale ſecundum.

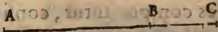


λθ

Ἐὰν δύο εὐθεῖαι δυνάμει ἀσύμμετροι συντεθῶσι ποιοῦσαι τὸ μὲν συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων ῥητὸν, τὸ δ' ὑπ' αὐτῶν μέσον, ἡ ὅλη εὐθεῖα ἄλογός ἐστι. καλείσθω δὲ μείζων.

Theor. 28. Propo.39.

Si duæ rectæ potentia incommenſurabiles componantur, conficientes compoſitum ex quadratis ipſarum rationale, parallelogrammum verò ex ipſis contentum mediale, tota linea recta eſt irrationalis. Vocetur autem linea maior.



μ

Ἐὰν δύο εὐθεῖαι δυνάμει ἀσύμμετροι συντεθῶσι, ποιοῦσαι τὸ μὲν συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων μέσον, τὸ δ' ὑπ' αὐτῶν ῥητόν, ἡ ὅλη εὐθεῖα ἄλογός ἐστι· καλείσθω δὲ ῥητὸν καὶ μέσον δυναμένη.

Theor. 29. Propo. 40.

Si duæ rectæ potentia incommensurabiles componantur, conficientes compositum ex ipsarum quadratis mediale, id verò quod fit ex ipsis, rationale, tota linea est irrationalis. Vocetur autem potens rationale & mediale.



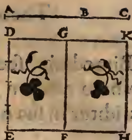
μα

Ἐὰν δύο εὐθεῖαι δυνάμει ἀσύμμετροι συντεθῶσι ποιοῦσαι τό, τε συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων μέσον, καὶ τὸ ὑπ' αὐτῶν μέσον, καὶ ἔτι ἀσύμμετρον τῷ συγκειμένῳ ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, ἡ ὅλη εὐθεῖα ἄλογός ἐστι. καλείσθω δὲ δύο μέσα δυναμένη.

Theor. 30. Propo. 41.

Si duæ rectæ potentia incommensurabiles componantur, conficiẽtes compositum ex quadratis ipsarum mediale, & quod cõtinetur ex ipsis, mediale, & præ-

terea incommensurabile composito ex quadratis ipsarum, tota linea est irrationalis. Vocetur autē Potens duo medialia.

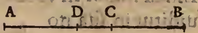


μβ

Ἡ ἐκ δύο ὀνομάτων καθ' ἓν μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor.31.Propo.42.

Binomium in vnico tantùm puncto diuiditur in sua nomina, id est in lineas ex quibus componitur.

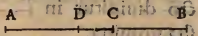


μγ

Ἡ ἐκ δύο μέσων πρώτη καθ' ἓν μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor.32.Proposi.43.

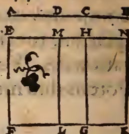
Bimediale prius in vnico tantùm pũcto diuiditur in sua nomina.



μδ

Ἡ ἐκ δύο μέσων δευτέρα καθ' ἓν μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor.33.Propo.44.



Bimediale secundum in vnico tantùm puncto diuiditur in sua nomina.

με

Ἡ μείζων κατὰ τὸ αὐτὸ μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor. 34.Propo.45.

Linea maior in vnico tantùm puncto diuiditur in sua nomina.



μς

Ἡ ῥητὸν καὶ μέσον δυναμένη καθ' ἓν μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor.35.Propo.46.

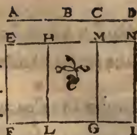
Linea potens rationale & mediale in vnico tantum pũcto diuiditur in sua nomina.



μζ

Ἡ δύο μέσα δυναμένη καθ' ἓν μόνον σημεῖον διαιρεῖται εἰς τὰ ὀνόματα.

Theor. 36. Proposi. 47.



Linea potẽs duo medialia in vnico tantùm puncto diuiditur in ſua nomina.

ὅροι δεύτεροι.

Ὑποκειμένης ῥητῆς, καὶ τῆς ἐκ δύο ὀνομάτων διῃρημένης εἰς τὰ ὀνόματα, ἧς τὸ μεῖζον ὄνομα τοῦ ἐλάττονος μεῖζον δύναται τῷ ἀπὸ συμμέτρου ἑαυτῷ μήκει.

α

Ἐὰν μὲν τὸ μεῖζον ὄνομα σύμμετρον ᾖ μήκει τῇ ἐκκειμένῃ ῥητῇ, καλείσθω ὅλη ἐκ δύο ὀνομάτων πρώτη.

β

Ἐὰν δὲ τὸ ἔλασσον ὄνομα σύμμετρον ᾖ μήκει τῇ ἐκκειμένῃ ῥητῇ, καλείσθω ἐκ δύο ὀνομάτων δευτέρα.

γ

Ἐὰν δὲ μηδέτερον τῶν ὀνομάτων σύμμετρον ᾖ μήκει τῇ ἐκκειμένῃ ῥητῇ, καλείσθω ἐκ δύο ὀνομάτων τρίτη.

Πάλιν δὴ ἐὰν τὸ μεῖζον ὄνομα τοῦ ἐλάσσονος μεῖζον δύνηται τῷ ἀπὸ ἀσυμμέτρου ἑαυτῷ μήκει,

δ

Ἐὰν μὲν τὸ μεῖζον ὄνομα σύμμετρον ᾖ μήκει τῇ ἐκκειμένῃ ῥητῇ, καλείσθω ἐκ δύο ὀνομάτων τετάρτη.

ε

Ἐὰν δὲ τὸ ἔλαττον, πέμπτη.

ζ

Ἐὰν δὲ μηδέτερον, ἕκτη.

DEFINITIONES
secundæ.

Proposita linea rationali, & binomio diuiso in sua nomina, cuius binomij maius nomẽ, id est maior portio poßit plusquam minus nomen quadrato lineæ sibi, maiori inquam nomini, commensurabilis longitudine:

1

Si quidem maius nomen fuerit commensurabile longitudine propositæ lineæ rationali; vocetur tota linea Binomium primum:

2

Si verò minus nomẽ, id est minor portio Binomij, fuerit commensurabile longitudine propositæ lineæ rationali, vocetur tota linea Binomiũ secundum:

3

Si verò neutrum nomen fuerit commensurabile longitudine propositæ lineæ rationali, vocetur Binomium tertium.

Rursus si maius nomen poßit plusquam minus nomen quadrato lineæ sibi incommensurabilis longitudine:

4

Si quidem maius nomen est commensurabile lõgitudine propositæ lineæ rationali, vocetur tota linea Binomium quartum:

5

Si verò minus nomẽ fuerit commensurabile longitudine lineæ rationali, vocetur Binomiũ quintum.

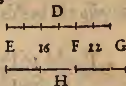
6

Si verò neutrum nomen fuerit longitudine commensurabile lineæ rationali, vocetur illa Binomium sextum.

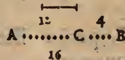
μη

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων πρώτην.

Probl. 12. Proposi. 48.



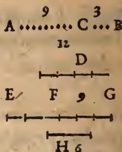
Reperire Binoniũ primum.



μθ

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων δευτέραν.

Proble.13.Proposi.49.

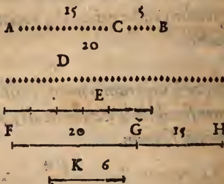


Reperire Binomiũ secundum.

ν

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων β'την.

Probl.14. Pro.50.

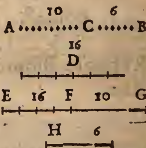


Reperire Binomium tertium.

να

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων τετάρτην.

Probl.15.Proposi.51.

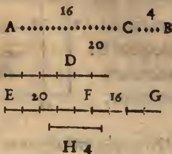


Reperire Binomiũ quartum.

νβ

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων πέμπτην.

Probl.16. Proposi.52.

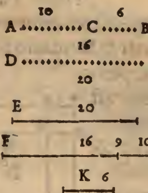


Reperire Binomium quintum.

νγ

Εὑρεῖν τὴν ἐκ δύο ὀνομάτων ἕκτην.

Probl.17.Proposi.53.



Reperire Binomium sextum.

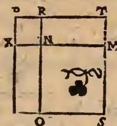
νδ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων πρώτης, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν ἡ καλουμένη ἐκ δύο ὀνομάτων.

Theor.37.Propo.54.

Si superficies contēta fuerit ex rationa-

li & Binomio primo, linea quæ illam ſuperficiem poteſt eſt irrationalis, quæ Binomium vocatur.



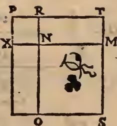


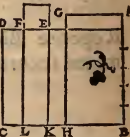
νε

Ε'ὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων δευτέρας, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν ἡ καλουμένη ἐκ δύο μέσων πρώτη.

Theor.38.Propo.55.

Si ſuperficies contenta fuerit ex linea rationali & Binomio ſecundo, linea potẽs illã ſuperficiem eſt irrationalis, quæ Bimediale primũ vocatur.





νϛ

Ε'ὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων τρίτης, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν ἡ καλουμένη ἐκ δύο μέσων δευτέρα.

Theor.39.Propo.56.

Si ſuperficies contineatur ex rationali & Binomio

Binomio tertio, linea quæ illā ſuperficiē poteſt, eſt irrationalis, quæ dicitur Bimediale ſecūdum.

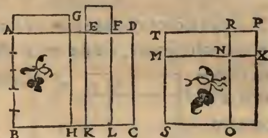


νζ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων τετάρτης, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν, ἡ καλουμένη μείζων.

Theor. 40. Propo. 57.

Si ſuperficies contineatur ex rationali & Binomio quarto, linea potēs ſuperficiem illam, eſt irrationalis, quæ dicitur maior.



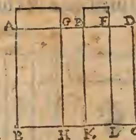
νη

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων πέμπτης, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν, ἡ καλουμένη ῥητὸν καὶ μέσον δυναμένη.

Theor. 41. Prop. 58.

Si ſuperficies contineatur ex rationali & Binomio quinto, linea quæ illam ſuper-

ficiẽ poteſt, eſt irrationalis quę dicitur potẽs rationale & mediale.



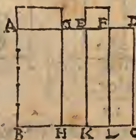


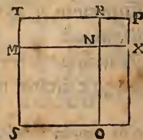
νθ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ τῆς ἐκ δύο ὀνομάτων ἕκτης, ἡ τὸ χωρίον δυναμένη ἄλογός ἐστιν, ἡ καλουμένη δύο μέσα δυναμένη.

Theor.42.Propo.59.

Si ſuperficies contineatur ex rationali & Binomio ſexto, linea quæ illam ſuperficiẽ poteſt, eſt irrationalis, quę dicitur potens duo medialia.





ξ

Τὸ ἀπὸ τῆς ἐκ δύο ὀνομάτων παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ τὴν ἐκ δύο ὀνομάτων πρώτην.

Theor.43.Propo.60.

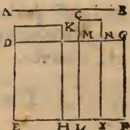


Quadratum Binomii secundum lineam rationalem applicatum, facit alterum latus Binonium primum.

ξα

Τὸ ἀπὸ τῆς ἐκ δύο μέσων πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων δευτέραν.

Theor.44.Propo.61.

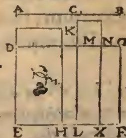


Quadratum Bimedialis primi secundum rationalem lineam applicatum, facit alterum latus Binomium secundum.

ξβ

Τὸ ἀπὸ τῆς ἐκ δύο μέσων δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων τρίτην.

Theor.54.proposit.62.

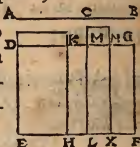


Quadratū Bimedialis secundi secundum rationalem applicatum, facit alterū latus Binomium tertium.

ξγ

Τὸ ἀπὸ τῆς μείζονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ τὴν ἐκ δύο ὀνομάτων τετάρτην.

Theor.46.Propo.63.



Quadratum lineæ maioris ſecundum lineam rationalem applicatũ, facit alterum latus Binomium quartum.

ξδ

Τὸ ἀπὸ τῆς ῥητὸν καὶ μέσον δυναμένης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων πέμπτην.

Theor.47.Propo.64.



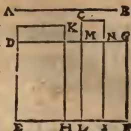
Quadratum lineæ potentis rationale & mediale ſecundũ rationalem applicatum, facit alterũ latus Binomium quintum.

ξε

Τὸ ἀπὸ τῆς ἐκ δύο μέσα δυναμένης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ τὴν, ἐκ δύο ὀνομάτων ἕκτην.

Theor.48.Propo.65.

Quadratum lineæ potentis duo medialia ſecundum rationalem applicatum, facit alterum latus Binomium ſextum.

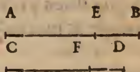


ξε

Ἡ τῇ ἐκ δύο ὀνομάτων μήκει σύμμετρος, καὶ αὐτὴ ἐκ δύο ὀνομάτων ἐστί, καὶ τῇ τάξει ἡ αὐτή.

Theor.49.Propo.66.

Linea lõgitudine cõmẽſurabilis Binomio eſt & ipſa Binomium eiuſdem ordinis.

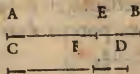


ξϛ

Ἡ τῇ ἐκ δύο μέσων μήκει σύμμετρος, ἐκ δύο μέσων ἐστί, καὶ τῇ τάξει ἡ αὐτή.

Theor.50.Propo.67.

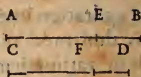
Linea lõgitudine cõmenſurabilis alteri bimedialium, eſt & ipſa bimediale etiam eiuſdem ordinis.



ξη

Ἡ τῇ μείζονι σύμμετρος, καὶ αὐτὴ μείζων ἐστίν.

Theor. 51. Propo. 68.



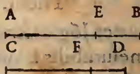
Linea commenſurabilis lineæ maiori, eſt & ipſa maior.

ξθ

Ἡ τῇ ῥητὸν καὶ μέσον δυναμένῃ σύμμετρος, καὶ αὐτὴ ῥητὸν καὶ μέσον δυναμένη ἐστίν.

Theor. 52. Propo. 69.

Linea commenſurabilis lineæ potenti rationale & mediale, eſt & ipſa linea potẽs rationale & mediale.

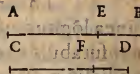


ο

Ἡ τῇ δύο μέσα δυναμένῃ σύμμετρος, δύο μέσα δυναμένη ἐστίν.

Theor. 53. Propo. 70.

Linea commenſurabilis lineæ potenti duo medialia, eſt & ipſa linea potens duo medialia.



οα

Ῥητοῦ καὶ μέσου συντιθεμένου, τέσσαρες ἄλογοι γίνονται, ἢ ἐκ δύο ὀνομάτων, ἢ ἐκ δύο μέσων πρώτη, ἢ μείζων, ἢ ἡ ῥητὸν καὶ μέσον δυναμένη.

Theor. 54. Prop. 71.

Si duæ ſuperficies rationalis & medialis ſimul componantur, linea quæ totam ſuperficiem compoſitam poteſt, eſt vna ex quatuor irrationalibus, vel ea quæ dicitur Binomium, vel bimediale primum, vel linea maior, vel linea potens rationale & mediale.

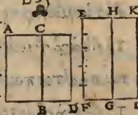


οβ

Δύο μέσων ἀσυμμέτρων ἀλλήλοις συντιθεμένων, αἱ λοιπαὶ δύο ἄλογοι γίνονται, ἤτοι ἡ ἐκ δύο μέσων δευτέρα, ἢ ἡ δύο μέσα δυναμένη.

Theor. 55. Propo. 72.

Si duæ ſuperficies mediales incommenſurabiles ſimul cōponantur, fiunt reliquæ duæ lineæ irrationales, vel bimediale ſecundum, vel linea potēs duo medialia.



ΣΧΟΛΙΟΝ.

Ἡ ἐκ δύο ὀνομάτων καὶ αἱ μετ᾽ αὐτὴν ἄλογοι, οὔτε τῇ μέσῃ, οὔτε ἀλλήλαις εἰσὶν αἱ αὐταί.

Τὸ μὲν γὰρ ἀπὸ μέσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ ῥητὴν, καὶ ἀσύμμετρον τῇ παρ᾽ ἣν παράκειται, μήκει.

Τὸ δὲ ἀπὸ τῆς ἐκ δύο ὀνομάτων παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων πρώτην.

Τὸ δὲ ἀπὸ τῆς ἐκ δύο μέσων πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων δευτέραν.

Τὸ δὲ ἀπὸ τῆς ἐκ δύο μέσων δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων τρίτην.

Τὸ δὲ ἀπὸ τῆς μείζονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων τετάρτην.

Τὸ δὲ ἀπὸ τῆς ῥητὸν καὶ μέσον δυναμένης παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων πέμπτην.

Τὸ δὲ ἀπὸ τῆς δύο μέσα δυναμένης παρὰ ῥητὴν πα-
ραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομά-
των ἕκτην.

Ἐπεὶ οὖν τὰ εἰρημένα πλάτη διαφέρει τοῦ τε πρώ-
του καὶ ἀλλήλων, τοῦ μὲν πρώτου, ὅτι ῥητή ἐστιν, ἀλλή-
λων δὲ, ὅτι τῇ τάξει οὐκ εἰσὶν αἱ αὐταί, δῆλον ὡς καὶ
αὐταὶ αἱ ἄλογοι διαφέρουσιν ἀλλήλων.

SCHOLIVM.

Binomium & cæteræ consequentes lineæ irratio-nales, neque sunt eædem cum linea mediali, neque ipsæ inter se.

Nam quadratum lineæ medialis applicatum secundum lineam rationalem, facit alterum latus lineam rationalem, & longitudine incommensurabilem lineæ secundum quam applicatur, hoc est, lineæ rationali, per 23.

Quadratum vero Binomij secundum rationalē applicatum, facit alterum latus Binomium primum, per 60.

Quadratum vero Bimedialis primi secundum rationalem applicatum, facit alterum latus Binomium secundum, per 61.

Quadratum vero Bimedialis secundi secundum rationalem applicatum, facit alterum latus Bi-

nomium tertium, per 62.

Quadratum verò lineæ maioris ſecũdum rationalem applicatum, facit alterũ latus Binomiũ quartum, per 63.

Quadratũ verò lineæ potentis rationale & mediale ſecundum rationalem applicatum, facit alterum latus Binomium quintum, per 64.

Quadratum verò lineæ potentis duo medialia ſecundum rationalem applicatum, facit alterum latus Binomium ſextum, per 65.

Cùm igitur dicta latera, quæ latitudines vocantur, differant & à prima latitudine, quoniam eſt rationalis, cùm inter ſe quoque differant, eo quia ſunt Binomia diuerſorum ordinum: manifeſtum eſt ipſas lineas irrationales, differentes eſſe inter ſe.

ΔΕΥΤΈΡΑ ΤΆΞΙΣ ἙΤΈΡΩΝ ΔΌγων τῶν καθ' ἀφαίρεσιν.

Ἀρχὴ τῶν κατ' ἀφαίρεσιν ἑξάδων.

γο

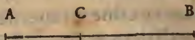
Ἐὰν ἀπὸ ῥητῆς ῥητὴ ἀφαιρεθῇ δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ ἀποτομή.

SECVNDVS ORDO ALTERIVS ſermonis, qui eſt de detractione.

Principiũ ſenariorũ per detractionẽ.

Theor.56.Propo.73.

Si de linea rationali detrahatur rationalis potentia tantùm commenſurabilis ipſi toti, reſidua eſt irrationalis. vocetur autem Reſiduum.



οδ

Ἐὰν ἀπὸ μέσης μέση ἀφαιρεθῇ δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ῥητὸν περιέχῃ, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ μέσης ἀποτομὴ πρώτη.

Probl.57.Propo.74.

Si de linea mediali detrahatur medialis potentia tantùm commenſurabilis toti lineæ, quæ verò detracta eſt cum tota cõtineat ſuperficiem rationalem, reſidua eſt irrationalis. Vocetur autem Reſiduum mediale primum.

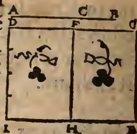


οε

Ἐὰν ἀπὸ μέσης μέση ἀφαιρεθῇ δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης μέσον περιέχῃ, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ μέσης ἀποτομὴ δευτέρα.

Theor.58. Propo.75.

Si de linea mediali detrahatur medialis potentia tantùm commensurabilis toti, quæ verò detracta est, cũ tota contineat superficiẽ medialem, reliqua est irrationalis. Vocetur autẽ Residuum mediale secũdum.



οϛ

Ἐὰν ἀπὸ εὐθείας εὐθεῖα ἀφαιρεθῇ δυνάμει ἀσύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ποιοῦσα τὸ μὲν ἀπ' αὐτῶν ἅμα ῥητὸν, τὸ δ' ὑπ' αὐτῶν μέσον, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ ἐλάσσων.

Theor.57. Propo.76.

Si de linea recta detrahatur recta potẽtia incommensurabilis toti, compositum autem ex quadratis totius lineæ & lineę detractæ sit rationale, parallelogrammũ verò ex iisdem contẽtum sit mediale, reliqua linea erit irrationalis. Vocetur autem linea minor.



οζ

Ἐὰν ἀπὸ εὐθείας εὐθεῖα ἀφαιρεθῇ δυνάμει ἀσύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ποιοῦσα τὸ μὲν

συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, μέσον, τὸ δὲ δὶς ὑπ' αὐτῶν, ῥητόν, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσα.

Theor. 58. Propo. 77.

Si de linea recta detrahatur recta potentia incommensurabilis toti lineæ, cõposi tum autem ex quadratis totius & lineæ detractę sit mediale, parallelogrammum verò bis ex eisdem cõtentum sit rationale, reliqua linea est irrationalis. Vocetur autem linea faciens cum superficie rationali totam superficiem medialem.



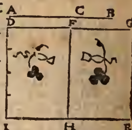
οη

Ἐὰν ἀπὸ εὐθείας εὐθεῖα ἀφαιρεθῇ δυνάμει ἀσύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ποιοῦσα τό τε συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, μέσον, τὸ δὲ δὶς ὑπ' αὐτῶν, μέσον, ἔτι δὲ τὰ ἀπ' αὐτῶν τετράγωνα ἀσύμμετρα τῷ δὶς ὑπ' αὐτῶν, ἡ λοιπὴ ἄλογός ἐστι. καλείσθω δὲ ἡ μετὰ μέσου μέσον τὸ ὅλον ποιοῦσα.

Theor. 59. Propo. 78.

Si de linea recta detrahatur recta potentia incommensurabilis toti lineæ, cõposi tum autem ex quadratis totius & lineæ detractæ sit mediale, parallelogrammũ

verò bis ex iiſdem ſit etiam mediale: prę- terea ſint quadrata ipſarum incommenſurabilia parallelogrammo bis ex iiſdem contẽto, reliqua linea eſt irrationalis. Vocetur autem linea faciens cum ſuperficie mediali totam ſuperficiem medialem.

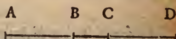


οθ

Τῇ ἀποτομῇ μία μόνον προσαρμόζει εὐθεῖα ῥητὴ, δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ.

Theor.60. Propo.79.

Reſiduo vnica tantũ linea recta cõiungitur rationalis, potẽtia tantùm cõmẽſurabilis toti lineæ.

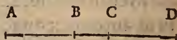


π

Τῇ μέσῃ ἀποτομῇ πρώτῃ μόνον μία προσαρμόζει εὐθεῖα μέση, δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ῥητὸν περιέχουσα.

Theor.61. Propo.80.

Reſiduo mediali primo vnica tantùm linea coniungitur medialis, potentia tantùm commẽſurabilis toti, ipſa cum tota continens rationale.

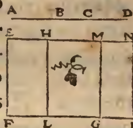


πα

Τῇ μέσης ἀποτομῇ δευτέρᾳ μία μόνον προσαρμόζει εὐθεῖα μέση, δυνάμει μόνον σύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης μέσον περιέχουσα.

Theor.62.Propoſi.81.

Reſiduo mediali ſecundo vnica tantùm coniungitur medialis, potētia tantùm commenſurabilis toti, ipſa cum tota continēs mediale.

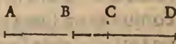


πβ

Τῇ ἐλάσσονι μία μόνον προσαρμόζει εὐθεῖα δυνάμει ἀσύμμετρος οὖσα τῇ ὅλῃ, ποιοῦσα μετὰ τῆς ὅλης τὸ μὲν ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, ῥητὸν, τὸ δὲ δὶς ὑπ' αὐτῶν, μέσον.

Theor.63. Propo.82.

Lineę minori vnica tantùm recta coniũgitur potentia incommenſurabilis toti, faciens cum tota compoſitũ ex quadratis ipſarum rationale, id verò parallelogrãmum, quod bis ex ipſis fit, mediale.



πγ

Τῇ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσῃ μία μόνον προσαρμόζει εὐθεῖα δυνάμει ἀσύμμετρος οὖσα τῇ

ὅλη, μετὰ δὲ τῆς ὅλης ποιοῦσα τὸ μὲν συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, μέσον, τὸ δὲ δὶς ὑπ' αὐτῶν, ῥητόν.

Theor.64.Propo.83.

Lineæ facienti cum ſuperficie rationali totam ſuperficiem medialem, vnica tantùm coniũgitur linea recta potentia incommenſurabilis toti, faciens autem cũ tota compoſitum ex quadratis ipſarum, mediale, id verò quod fit bis ex ipſis, rationale.

πδ

Τῇ μετὰ μέσου μέσον τὸ ὅλον ποιούσῃ μία μόνον προσαρμόζει εὐθεῖα δυνάμει ἀσύμμετρος οὖσα τῇ ὅλῃ, μετὰ δὲ τῆς ὅλης ποιοῦσα τό, τε συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τετραγώνων, μέσον, τὸ δὲ δὶς ὑπ' αὐτῶν, μέσον, καὶ ἔτι ἀσύμμετρον τὸ συγκείμενον ἐκ τῶν ἀπ' αὐτῶν τῷ δὶς ὑπ' αὐτῶν.

Theor.65.Propo.84.

Lineæ cum mediali ſuperficie faciẽti totam ſuperficiem medialem, vnica tantũ coniungitur linea potentia toti incõmenſurabilis, faciens cum tota compoſitum ex quadratis ipſarũ mediale, id verò quod fit

bis

bis ex ipsis etiam mediale, & præterea faciens compositum ex quadratis ipsarum incómensurabile ei quod fit bis ex ipsis.

ὅροι τρίτοι.

Ὑποκειμένης ῥητῆς καὶ ἀποτομῆς.

α

Ἐὰν μὲν ἡ ὅλη τῆς προσαρμοζούσης μεῖζον δύνηται τῷ ἀπὸ συμμέτρου ἑαυτῇ μήκει, καὶ ἡ ὅλη σύμμετρος ᾖ τῇ ἐκκειμένῃ ῥητῇ μήκει, καλείσθω ἀποτομὴ πρώτη.

β

Ἐὰν δὲ ἡ προσαρμόζουσα σύμμετρος ᾖ τῇ ἐκκειμένῃ ῥητῇ μήκει, καὶ ἡ ὅλη τῆς προσαρμοζούσης μεῖζον δύνηται τῷ ἀπὸ συμμέτρου ἑαυτῇ, καλείσθω ἀποτομὴ δευτέρα.

γ

Ἐὰν δὲ μηδετέρα σύμμετρος ᾖ τῇ ἐκκειμένῃ ῥητῇ μήκει, ἡ δὲ ὅλη τῆς προσαρμοζούσης μεῖζον δύνηται τῷ ἀπὸ συμμέτρου ἑαυτῇ, καλείσθω ἀποτομὴ τρίτη.

Πάλιν ἐὰν ἡ ὅλη τῆς προσαρμοζούσης μεῖζον δύνηται τῷ ἀπὸ ἀσυμμέτρου ἑαυτῇ μήκει.

δ

ἐὰν μὲν ἡ ὅλη σύμμετρος ᾖ τῇ ἐκκειμένῃ ῥητῇ μήκει, καλείσθω ἀποτομὴ τετάρτη.

ε

ἐὰν δὲ ἡ προσαρμόζουσα, πέμπτη.

ς

ἐὰν δὲ μηδετέρα, ἕκτη.

DEFINITIONES tertiæ.

Proposita linea rationali & residuo.

I

Siquidem tota, nempe composita ex ipso residuo & linea illi coniuncta, plus potest quàm coniuncta, quadrato lineæ sibi commensurabilis longitudine, fuerítque tota longitudine commensurabilis lineæ propositæ rationali, residuum ipsum vocetur Residuum primum:

2

Si verò coniuncta fuerit longitudine commensurabilis rationali, ipsa autem tota plus possit quàm coniuncta, quadrato lineæ sibi longitudine commensurabilis, residuum vocetur Residuum secundum:

3

Si verò neutra linearum fuerit longitudine

commensurabilis rationali, poßit autem ipsa tota plusquam coniuncta, quadrato lineæ sibi longitudine commensurabilis vocetur Residuum tertium.

Rursus si tota poßit plus quàm coniuncta, quadrato lineæ sibi lõgitudine incõmensurabilis:

4

Et quidem si tota fuerit longitudine commensurabilis ipsi rationali, vocetur Residuum quartum:

5

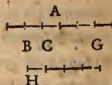
Si verò coniuncta fuerit longitudine commẽsurabilis rationali, & tota plus poßit quàm coniuncta, quadrato lineæ sibi longitudine incommẽsurabilis, vocetur Residuum quintum.

6

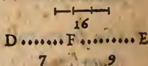
Si verò neutra linearum fuerit commensurabilis longitudine ipsi rationali, fueritque tota potentior quàm coniuncta, quadrato lineæ sibi longitudine incommensurabilis, vocetur Residuum sextum.

π ϛ

εὑρεῖν τὴν πρώτην ἀποτομήν.



Probl.18.Propoſi. 85.

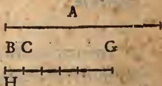


Reperire primum Reſiduum.

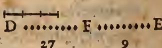
πς

Εὑρεῖν τὴν δευτέραν ἀποτομήν.

Probl.19.Propoſi.86.

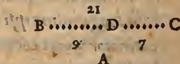


Reperire ſecundum Reſiduum.



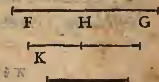
πζ

Εὑρεῖν τὴν τρίτην ἀποτομήν.



Probl.20.Propoſi.87.

Reperire tertium Reſiduum.

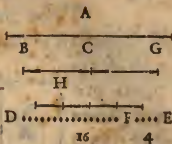


πη

Εὑρεῖν τὴν τετάρτην ἀποτομήν.

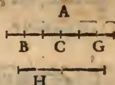
Probl. 21. Proposi.88.

Reperire quartum Residuum.



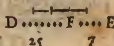
π θ

Εὑρεῖν τὴν πέμπτην ἀποτομήν.



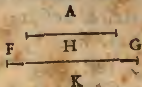
Problema 22. Propositio 89.

Reperire quintum Residuum.



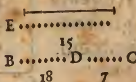
ϛ

Εὑρεῖν τὴν ἕκτην ἀποτομήν.



Ploblema 22. Propositio. 90.

Reperire sextum Residuum.

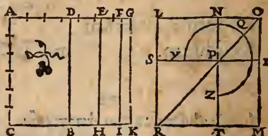


ϛα

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πρώτης, ἡ τὸ χωρίον δυναμένη, ἀποτομή ἐστιν.

Theor.66.Proposi.91.

Si ſuperficies cõtineatur ex linea rationali & reſiduo primo, linea quæ illam ſuperficiẽ poteſt, eſt reſiduum.

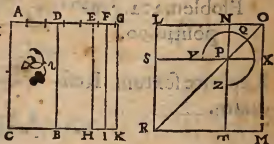


ϟϐ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς δευτέρας, ἡ τὸ χωρίον δυναμένη, μέσης ἀποτομή ἐστι πρώτη.

Theor.67.Propo.92.

Si ſuperficies cõtineatur ex linea rationali & reſiduo ſecundo, linea quæ illam ſuperficiẽ poteſt, eſt reſiduum mediale primum.

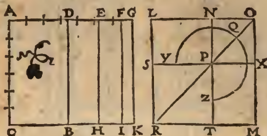


ϟγ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς τρίτης, ἡ τὸ χωρίον δυναμένη, μέσης ἀποτομή ἐστι δευτέρα.

Theor.68. Propo. 93.

Si ſuperficies contineatur ex linea rationali & reſiduo tertio, linea quæ illam ſuperficiem poteſt, eſt reſiduum mediale ſecũdum.

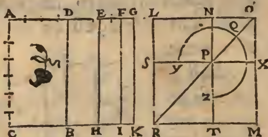


ϟδ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς τετάρτης, ἡ τὸ χωρίον δυναμένη, ἐλάσσων ἐστί.

Theor.69.Propo.94.

Si ſuperficies contineatur ex linea rationali & reſiduo quarto, linea quæ illam ſuperficiẽ poteſt, eſt linea minor.

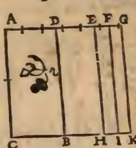


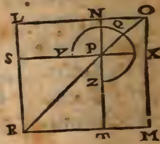
ϟε

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πέμπτης, ἡ τὸ χωρίον δυναμένη, ἡ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσά ἐστι.

Theor. 70. Propo. 95.

Si superficies contineatur ex linea rationali & residuo quinto, linea quæ illam superficiem potest, est ea quæ dicitur cum rationali superficie faciens totam medialem.



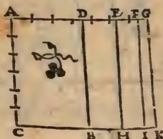


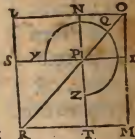
ϟε

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πέμπτης, ἡ τὸ χωρίον δυναμένη, μετὰ μέσου μέσον τὸ ὅλον ποιοῦσά ἐστι.

Theor. 71. Prop. 96.

Si superficies contineatur ex linea rationali & residuo sexto, linea quæ illam superficiem potest, est ea quæ dicitur faciẽs cum mediali superficie totam medialem.

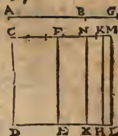




ϟϛ

Τὸ ἀπὸ ἀποτομῆς παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πρώτην.

Theor.72.Propo.97.



Quadratum reſidui ſecundum lineam rationalem applicatum, facit alterũ latus Reſiduum primum.

ϟη

Τὸ ἀπὸ μέσης ἀποτομῆς πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν δευτέραν.

Theor.73.Propo.98.



Quadratum reſidui medialis primi ſecundum rationalem applicatum, facit alterum latus reſiduũ ſecundum.

ϟθ

Τὸ ἀπὸ μέσης ἀποτομῆς δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τρίτην.

Theor.74.Propoſi.99.

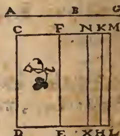


Quadratum reſidui medialis ſecundi ſecundum rationalem applicatum, facit alterum latus Reſiduum tertium.

ρ

Τὸ ἀπὸ ἐλάσσονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τετάρτην.

Theor. 75. Propo.100.



Quadratum lineę minoris ſecũdum rationalem applicatum, facit alterũ latus reſiduum quartum.

ρα

Τὸ ἀπὸ τῆς μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πέμπτην.

Theor.76. Propo.101.



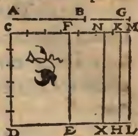
Quadratum lineæ cũ rationali ſuperficie faciẽtis totam medialem, ſecundum rationalem applicatum, facit alterũ latus reſiduum quintum.

ρβ

Τὸ ἀπὸ τῆς μετὰ μέσου μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν ἕκτην.

Theor.77.Propo.102.

Quadratum lineæ cum mediali ſuperficie facientis totam medialem, ſecundum rationalem applicatum, facit alterum latus reſiduum ſextum.

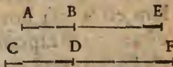


ργ

Ἡ τῇ ἀποτομῇ μήκει σύμμετρος, ἀποτομή ἐστι, καὶ τῇ τάξει ἡ αὐτή.

Theor.78.Propo.103.

Linea reſiduo cõmenſurabilis longitudine, eſt & ipſa reſiduum, & eiuſdem ordinis.

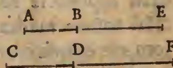


ρδ

Ἡ τῇ μέσῃ ἀποτομῇ σύμμετρος, μέσης ἀποτομή ἐστι, καὶ τῇ τάξει ἡ αὐτή.

Theor.79.Propo.104.

Linea commenſurabilis reſiduo mediali, eſt & ipſa reſiduũ mediale, & eiuſdem ordinis.

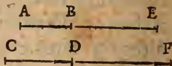


ρε

Ἡ τῇ ἐλάσσονι σύμμετρος, ἐλάσσων ἐστίν.

Theor.80.Prop.105.

Linea commenſurabilis lineæ minori, eſt & ipſa linea minor.

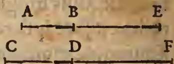


ρϛ

Ἡ τῇ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσῃ σύμμετρος, καὶ αὐτὴ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσά ἐστιν.

Theor.81.Propo.106.

Linea commenſurabilis lineæ cum rationali ſuperficie facienti totam medialem, eſt & ipſa linea cũ rationali ſuperficie faciens totã medialem.

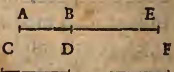


ρζ

Ἡ τῇ μετὰ μέσου μέσον τὸ ὅλον ποιούσῃ σύμμετρος, καὶ αὐτὴ μετὰ μέσου μέσον τὸ ὅλον ποιοῦσά ἐστιν.

Theor.82.Propo.107.

Linea commenſurabilis lineæ cum mediali ſuperficie faciẽti totam medialem, eſt & ipſa cum mediali ſuperficie faciens totam medialem.

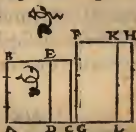


ρη

Ἀπὸ ῥητοῦ, μέσου ἀφαιρουμένου, ἡ τὸ λοιπὸν χωρίον δυναμένη, μία δύο ἀλόγων γίνεται, ἤτοι ἀποτομὴ, ἢ ἐλάττων.

Theor.83.Propo.108.

Si de ſuperficie rationali detrahatur ſuperficies medialis, linea quæ reliquam ſuperficiem poteſt, eſt alterutra ex duabus irrationalibus, aut Reſiduum, aut linea minor.

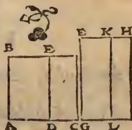


ρθ

Ἀπὸ μέσου, ῥητοῦ ἀφαιρουμένου, ἄλλαι δύο ἄλογοι γίνονται, ἤτοι μέση ἀποτομὴ πρώτη, ἢ μετὰ ῥητοῦ τὸ ὅλον ποιοῦσα.

Theor.84.Propo.109.

Si de ſuperficie mediali detrahatur ſuperficies rationalis, aliæ duæ irrationales fiũt, aut reſiduũ mediale primũ, aut cum rationali ſuperficiem faciens totam medialem.



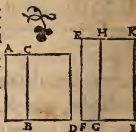
ρι

Ἀπὸ μέσου, μέσου ἀφαιρουμένου ἀσυμμέτρου τῷ ὅλῳ,

αἱ λειπαὶ δύο ἄλογοι γίνονται, ἤτοι μέση ἀποτομὴ δευτέρα, ἢ μετὰ μέσου μέσον τὸ ὅλον ποιοῦσα.

Theor.85. Propo.110.

Si de superficie mediali detrahatur superficies medialis quæ sit incōmēsurabilis toti, reliquæ duæ fiunt irrationales, aut residuū mediale secundum, aut cū mediali superficie faciens totam medialem.

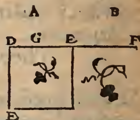


ρια

Ἡ ἀποτομὴ οὐκ ἔστιν ἡ αὐτὴ τῇ ἐκ δύο ὀνομάτων.

Theor.86. Propo.111.

Linea quæ Residuum dicitur, nō est eadem cum ea quæ dicitur Binomiū.



ΣΧΟΛΙΟΝ.

Ἡ ἀποτομὴ καὶ αἱ μετ' αὐτὴν ἄλογοι, οὔτε τῇ μέσῃ οὔτε ἀλλήλαις εἰσὶν αἱ αὐταί.

Τὸ μὲν γὰρ ἀπὸ μέσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ῥητὴν καὶ ἀσύμμετρον τῇ

παρ' ἣν παράκειται, μήκει.

Τὸ δὲ ἀπὸ ἀποτομῆς παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πρώτην.

Τὸ δὲ ἀπὸ μέσης ἀποτομῆς πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν δευτέραν.

Τὸ δὲ ἀπὸ μέσης ἀποτομῆς δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τρίτην.

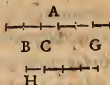
Τὸ δὲ ἀπὸ ἐλάττονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τετάρτην.

Τὸ δὲ ἀπὸ τῆς μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πέμπτην.

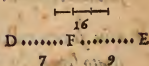
Τὸ δὲ ἀπὸ τῆς μετὰ μέσου μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν ἕκτην.

Ἐπεὶ οὖν τὰ εἰρημένα πλάτη διαφέρει τοῦ τε πρώτου καὶ ἀλλήλων (τοῦ μὲν πρώτου, ὅτι ῥητή ἐστιν, ἀλλήλων δὲ, ὅτι τάξει οὐκ εἰσὶν αἱ αὐταί) δῆ-

Probl.18.Proposi. 85.



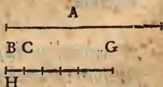
Reperire primum Residuum.



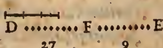
πς

Εὑρεῖν τὴν δευτέραν ἀποτομήν.

Probl.19.Proposi.86.



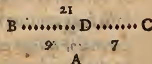
Reperire secundum Residuum.



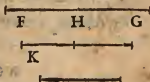
πζ

Εὑρεῖν τὴν τρίτην ἀποτομήν.

Probl.20.Proposi.87.



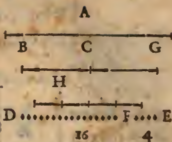
Reperire tertium Residuum.



πη

Εὑρεῖν τὴν τετάρτην ἀποτομήν.

Probl. 21. Proposi.88.

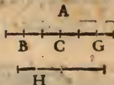


Reperire quartum Residuum.

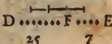
πθ

εὑρεῖν τὴν πέμπτην ἀποτομήν.

Problema 22. Propositio 89.



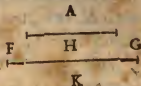
Reperire quintum Residuum.



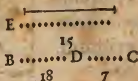
ϛ

εὑρεῖν τὴν ἕκτην ἀποτομήν.

Ploblema 22. Propositio.90.



Reperire sextum Residuum.

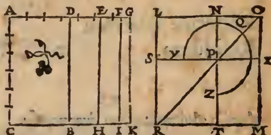


ϛα

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πρώτης, ἡ τὸ χωρίον δυναμένη, ἀποτομή ἐστιν.

Theor.66.Propoſi.91.

Si ſuperficies cõtineatur ex linea rationali & reſiduo primo, linea quæ illam ſuperficiẽ poteſt, eſt reſiduum.

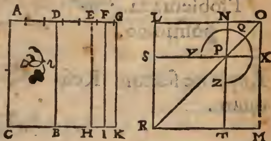


ϟβ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς δευτέρας, ἡ τὸ χωρίον δυναμένη, μέσης ἀποτομή ἐστι πρώτη.

Theor.67.Propo.92.

Si ſuperficies cõtineatur ex linea rationali & reſiduo ſecundo, linea quæ illam ſuperficiẽ poteſt, eſt reſiduũm mediale primum.

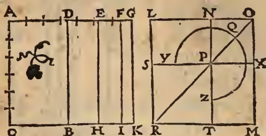


ϟγ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς τρίτης, ἡ τὸ χωρίον δυναμένη, μέσης ἀποτομή ἐστι δευτέρα.

Theor.68. Propo. 93.

Si ſuperficies contineatur ex linea rationali & reſiduo tertio, linea quæ illam ſuperficiem poteſt, eſt reſiduum mediale ſecūdum.

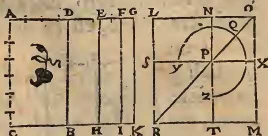


ϟδ

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς τετάρτης, ἡ τὸ χωρίον δυναμένη, ἐλάσσων ἐστί.

Theor.69.Propo.94.

Si ſuperficies contineatur ex linea rationali & reſiduo quarto, linea quæ illam ſuperficiē poteſt, eſt linea minor.

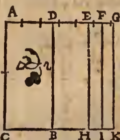


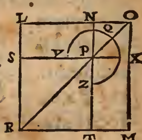
ϟε

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πέμπτης, ἡ τὸ χωρίον δυναμένη, ἡ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσά ἐστι.

Theor. 70. Propo. 95.

Si superficies contineatur ex linea rationali & residuo quinto, linea quæ illam superficiem potest, est ea quæ dicitur cum rationali superficie faciens totam medialem.



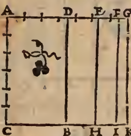


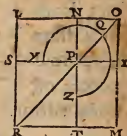
ϟε

Ἐὰν χωρίον περιέχηται ὑπὸ ῥητῆς καὶ ἀποτομῆς πέμπτης, ἡ τὸ χωρίον δυναμένη, μετὰ μέσου μέσον τὸ ὅλον ποιοῦσά ἐστι.

Theor.71. Prop.96.

Si superficies contineatur ex linea rationali & residuo sexto, linea quæ illam superficiem potest, est ea quæ dicitur faciẽs cum mediali superficie totam medialem.

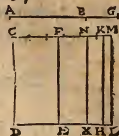




ϟζ

Τὸ ἀπὸ ἀποτομῆς παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πρώτην.

Theor.72.Propo.97.

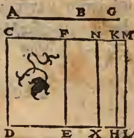


Quadratum reſidui ſecundum lineam rationalem applicatum, facit alterũ latus Reſiduum primum.

ϛη

Τὸ ἀπὸ μέσης ἀποτομῆς πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν δευτέραν.

Theor.73.Propo.98.



Quadratum reſidui medialis primi ſecundum rationalem applicatum, facit alterum latus reſiduũ ſecundum.

ϛθ

Τὸ ἀπὸ μέσης ἀποτομῆς δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τρίτην.

Theor.74.Propoſi.99.

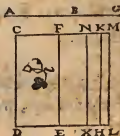


Quadratum reſidui medialis ſecundi ſecundum rationalem applicatum, facit alterum latus Reſiduum tertium.

ϙ

Τὸ ἀπὸ ἐλάσσονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τετάρτην.

Theor. 75. Propo.100.



Quadratum lineę minoris secũdum rationalem applicatum, facit alterũ latus residuum quartum.

ρα

Τὸ ἀπὸ τῆς μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πέμπτην.

Theor.76. Propo.101.



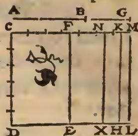
Quadratum lineæ cũ rationali superficie faciẽtis totam medialem, secundum rationalem applicatum, facit alterũ latus residuum quintum.

ρβ

Τὸ ἀπὸ τῆς μετὰ μέσου μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν ἕκτην.

Theor.77.Propo.102.

Quadratum lineæ cum mediali ſuperficie facientis totam medialem, ſecundum rationalem applicatum, facit alterum latus reſiduum ſextum.

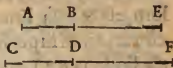


ργ

Ἡ τῇ ἀποτομῇ μήκει σύμμετρος, ἀποτομή ἐστι, καὶ τῇ τάξει ἡ αὐτή.

Theor.78.Propo. 103.

Linea reſiduo cõmenſurabilis longitudine, eſt & ipſa reſiduum, & eiuſdem ordinis.

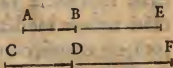


ρδ

Ἡ τῇ μέσῃ ἀποτομῇ σύμμετρος, μέσῃ ἀποτομή ἐστι, καὶ τῇ τάξει ἡ αὐτή.

Theor.79.Propo.104.

Linea commenſurabilis reſiduo mediali, eſt & ipſa reſiduũ mediale, & eiuſdem ordinis.

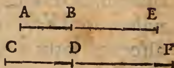


ρε

Ἡ τῇ ἐλάσσονι σύμμετρος, ἐλάσσων ἐστίν.

Theor.80.Prop.105.

Linea commenſurabilis lineæ minori, eſt & ipſa linea minor.

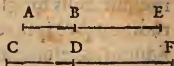


ρϛ

Ἡ τῇ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσῃ σύμμετρος, καὶ αὐτὴ μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσά ἐστιν.

Theor.81.Propo.106.

Linea commenſurabilis lineæ cum rationali ſuperficie facienti totam medialem, eſt & ipſa linea cũ rationali ſuperficie faciens totã medialem.

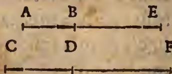


ρζ

Ἡ τῇ μετὰ μέσου μέσον τὸ ὅλον ποιούσῃ σύμμετρος, καὶ αὐτὴ μετὰ μέσου μέσον τὸ ὅλον ποιοῦσά ἐστιν.

Theor.82.Propo.107.

Linea commenſurabilis lineæ cum mediali ſuperficie faciẽti totam medialem, eſt & ipſa cum mediali ſuperficie faciens totam medialem.

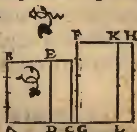


ρη

Ἀπὸ ῥητῦ, μέσυ ἀφαιρυμένυ, ἡ τ̓ λοιπὸν χωρίον δυναμένη, μία δύο ἀλόγων γίνεται, ἤτοι ἀποτομὴ, ἢ ἐλάττων.

Theor.83.Propo.108.

Si de ſuperficie rationali detrahatur ſuperficies medialis, linea quæ reliquam ſuperficiem poteſt, eſt alterutra ex duabus irrationalibus, aut Reſiduum, aut linea minor.

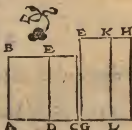


ρθ

Ἀπὸ μέσυ, ῥητῦ ἀφαιρυμένυ, ἄλλαι δύο ἄλογοι γίνονται, ἤτοι μέση ἀποτομὴ πρώτη, ἢ μετὰ ῥητῦ τ̓ ὅλον ποιῦσα.

Theor.84.Propo.109.

Si de ſuperficie mediali detrahatur ſuperficies rationalis, aliæ duæ irrationales fiũt, aut reſiduũ mediale primũ, aut cum rationali ſuperficiem faciens totam medialem.



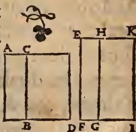
ρι

Ἀπὸ μέσυ, μέσυ ἀφαιρυμένυ ἀσυμμέτρυ τῷ ὅλῳ,

αἱ λειπαὶ δύο ἄλογοι γίνονται, ἤτοι μέση ἀποτομὴ δευτέρα, ἢ μετὰ μέσου μέσον τὸ ὅλον ποιοῦσα.

Theor.85.Propo.110.

Si de superficie mediali detrahatur superficies medialis quæ sit incōmēsurabilis toti, reliquæ duæ fiunt irrationales, aut residuū mediale secundum, aut cū mediali superficie faciens totam medialem.

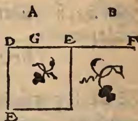


ρια

Ἡ ἀποτομὴ οὐκ ἔστιν ἡ αὐτὴ τῇ ἐκ δύο ὀνομάτων.

Theor.86.Propo.111.

Linea quæ Residuum dicitur, nō est eadem cum ea quæ dicitur Binomiū.



ΣΧΟΛΙΟΝ.

Ἡ ἀποτομὴ καὶ αἱ μετ' αὐτὴν ἄλογοι, οὔτε τῇ μέσῃ οὔτε ἀλλήλαις εἰσὶν αἱ αὐταί.

Τὸ μὲν γὰρ ἀπὸ μέσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ῥητὴν καὶ ἀσύμμετρον τῇ

παρ' ἣν παράκειται, μήκει.

Τὸ δὲ ἀπὸ ἀποτομῆς παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πρώτην.

Τὸ δὲ ἀπὸ μέσης ἀποτομῆς πρώτης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν δευτέραν.

Τὸ δὲ ἀπὸ μέσης ἀποτομῆς δευτέρας παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τρίτην.

Τὸ δὲ ἀπὸ ἐλάττονος παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν τετάρτην.

Τὸ δὲ ἀπὸ τῆς μετὰ ῥητοῦ μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν πέμπτην.

Τὸ δὲ ἀπὸ τῆς μετὰ μέσου μέσον τὸ ὅλον ποιούσης παρὰ ῥητὴν παραβαλλόμενον, πλάτος ποιεῖ, ἀποτομὴν ἕκτην.

Ἐπεὶ οὖν τὰ εἰρημένα πλάτη διαφέρει τοῦ τε πρώτου καὶ ἀλλήλων (τοῦ μὲν πρώτου, ὅτι ῥητή ἐστιν, ἀλλήλων δὲ, ὅτι τάξει οὐκ εἰσὶν αἱ αὐταί) δῆ-

λογ ὡς καὶ αὐταὶ αἱ ἄλογοι διαφέρουσιν ἀλλήλων. καὶ ἐπεὶ δέδεικται ἡ ἀποτομὴ οὐκ οὖσα ἡ αὐτὴ τῇ ἐκ δύο ὀνομάτων, ποιοῦσι δὲ πλάτη παρὰ ῥητὴν παραβαλλόμεναι μὲν αἱ μετὰ τὴν ἀποτομὴν, ἀποτομὰς ἀκολούθως τῇ τάξει καθ᾽ αὐτὴν, αἱ δὲ μετὰ τὴν ἐκ δύο ὀνομάτων, τὰς ἐκ δύο ὀνομάτων, καὶ αὗται τῇ τάξει ἀκολούθως, ἕτεραι ἄρα εἰσὶν αἱ μετὰ τὴν ἀποτομὴν, καὶ ἕτεραι αἱ μετὰ τὴν ἐκ δύο ὀνομάτων, ὥς εἶναι τῇ τάξει πάσας ἀλόγους ιγ.

α Μέσην.
β Ἐκ δύο ὀνομάτων.
γ Ἐκ δύο μέσων πρώτην.
δ Ἐκ δύο μέσων δευτέραν.
ε Μείζονα.
ς Ῥητὸν καὶ μέσον δυναμένην.
ζ Δύο μέσα δυναμένην.
η Ἀποτομήν.
θ Μέσην ἀποτομὴν πρώτην.
ι Μέσης ἀποτομὴν δευτέραν.
ια Ἐλάττονα.
ιβ Μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσαν.
ιγ Μετὰ μέσου μέσον τὸ ὅλον ποιοῦσαν.

SCHO-

SCHOLIVM.

Linea quæ Residuum dicitur, & cæteræ quinque eam consequentes irrationales, neque lineæ mediali neq; sibi ipsæ inter se sunt eadē. Nam quadratum lineæ medialis secundum rationalem applicatum, facit alterum latus, rationalem lineam longitudine incommensurabilem ei, secundū quam applicatur, per 23. Quadratum verò residui secundum rationalem applicatum, facit alterum latus residuū primum, per 97.

Quadratum verò residui medialis primi secundum rationalem applicatum, facit alterum latus residuum secundum, per 98.

Quadratum verò residui medialis secundi, facit alterum latus residuum tertiū, per 99.

Quadratum verò lineæ minoris facit alterū latus residuum quartum, per 100.

Quadratum verò lineæ cum rationali superficie facientis totam medialem, facit alterum latus residuum quintum, per 101.

Quadratum verò lineæ cum mediali superficie facientis totam medialem, secundum rationalem applicatum, facit alterum latus residuum sextum, per 102.

Cùm igitur dicta latera, quæ sunt latitudines cuiusque parallelogrammi vnicuique quadrato æqualis & secundum rationalem applicati, differant & à primo latere, & ipsa inter se (nam à primo differunt, quoniã est rationalis linea: inter se verò differunt, quoniam sunt residua non eiusdem ordinis) constat ipsas quoque lineas irrationales inter se differentes esse. Et quoniam demonstratum est residuum non esse idem quod Binomium, quadrata autem residui & quinque linearũ irrationalium illud consequentium, secundũ rationalem applicata, faciunt altera latera ex residuis eiusdem ordinis cuius sunt & residua, quorum quadrata applicantur rationali: similiter & quadrata Binomij & quinque linearum irrationalium illud consequentium, secundum rationalem applicata, faciunt altera latera ex Binomiis eiusdem ordinis cuius sunt & Binomia, quorum quadrata applicantur rationali. Ergo lineæ irrationales quæ consequuntur Binomium, & quæ consequuntur residuum, sunt inter se differentes. Quare dictæ lineæ omnes irrationales sunt numero 13.

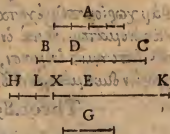
1 *Medialis.*
2 *Binomium.*
3 *Bimediale primũ.*
4 *Bimediale secũdũ.*
5 *Maior.*
6 *Potẽs rationale & mediale.*
7 *Potẽs duo medialia.*
8 *Residuum.*
9 *Residuum mediale primum.*
10 *Residuum mediale secundum.*
11 *Minor.*
12 *Faciens cum rationali superficie totam medialem.*
13 *Faciens cum mediali superficie totam medialem.*

ριβ

Τὸ ἀπὸ ῥητῆς παρὰ τὴν ἐκ δύο ὀνομάτων παραβαλλόμενον, πλάτος ποιεῖ ἀποτομήν, ἧς τὰ ὀνόματα σύμμετρά ἐστι τοῖς τῆς ἐκ δύο ὀνομάτων ὀνόμασι, καὶ ἐν τῷ αὐτῷ λόγῳ. καὶ ἔτι ἡ γινομένη ἀποτομὴ τὴν αὐτὴν ἕξει τάξιν τῇ ἐκ δύο ὀνομάτων.

Theor.87.Propo.112.

Quadratum lineæ rationalis secundum Binomium applicatum, facit alterum latus residuum, cuius nomina sunt commensurabilia Binomii nominibus, & in eadẽ proportione: præterea id quod fit Residuum, eundem



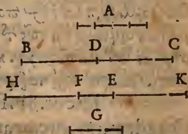
ordinem retinet quem Binomium.

ριγ

Τὸ ἀπὸ ῥητῆς παρὰ ἀποτομὴν παραβαλλόμενον, πλάτος ποιεῖ, τὴν ἐκ δύο ὀνομάτων ἧς τὰ ὀνόματα σύμμετρά ἐστι τοῖς τῆς ἀποτομῆς ὀνόμασι, καὶ ἐν τῷ αὐτῷ λόγῳ. ἔτι δὲ ἡ γινομένη ἐκ δύο ὀνομάτων, τὴν αὐτὴν τάξιν ἔχει τῇ ἀποτομῇ.

Theor. 88. Propo. 113.

Quadratum lineæ rationalis secundum residuum applicatum, facit alterũ latus Binomium, cuius nomina sunt commensurabilia nominibus residui & in eadem proportione: preterea id qđ fit Binomium est eiusdẽ ordinis, cuius & Residuum.



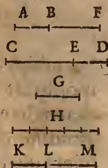
ριδ

Ἐὰν χωρίον περιέχηται ὑπὸ ἀποτομῆς καὶ τῆς ἐκ δύο ὀνομάτων, ἧς τὰ ὀνόματα σύμμετρά ἐστι τοῖς τῆς ἀποτομῆς ὀνόμασι, καὶ ἐν τῷ αὐτῷ λόγῳ, ἡ τὸ χωρίον δυναμένη, ῥητή ἐστι.

Theor. 89. Propo. 114.

Si parallelogrammum cõtineatur ex re-

ſiduo & Binomio, cuius nomina ſunt commenſurabilia nominibus reſidui & in eadem proportione, linea quæ illam ſuperficiem poteſt, eſt rationalis.

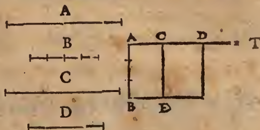


ρις

Ἀπὸ μέσης ἄπειροι ἄλογοι γίνονται, ἐκ οὐδεμία οὐδεμιᾷ τῶν πρότερον ἡ αὐτή.

Theor.90.Propo.115.

Ex linea mediali naſcuntur lineæ irrationales innumerabiles, quarum nulla vlli ante dictarum eadem ſit.

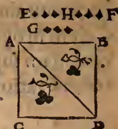


ρις

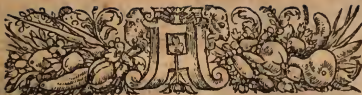
Προκείσθω ἡ μὲν δεῖξαι, ὅτι ἐπὶ τῶν τετραγώνων σχημάτων, ἀσύμμετρός ἐστιν ἡ διάμετρος τῇ πλευρᾷ μήκει.

Propo. 116.

Propositũ nobis esto demonstrare in figuris quadratis diametrum esse lõgitudine incommensurabilem ipsi lateri.



Elementi decimi finis.



ΕΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙΟΝ ΙΑ ΚΑΙ ΣΤΕΡΕΩΝ ΠΡΩΤΟΝ.

EVCLIDIS ELEMENTVM VNDECIMVM, ET SOLIDORVM primum.

ὅροι.

α

Στερεόν ἐστι τὸ μῆκος, καὶ πλάτος, καὶ βάθος ἔχον.

DEFINITIONES

I

Solidum, eſt quod longitudinem, latitudinem, & craſsitudinem habet.

β

Στερεοῦ δὲ πέρας, ἐπιφάνεια.

2

Solidi autem extremum eſt ſuperficies.

γ

Εὐθεῖα πρὸς ἐπίπεδον ὀρθή ἐστιν, ὅταν πρὸς πάσας τὰς ἁπτομένας αὐτῆς εὐθείας, καὶ οὔσας ἐν τῷ αὐτῷ ὑποκειμένῳ ἐπιπέδῳ, ὀρθὰς ποιῇ γωνίας.

3

Linea recta eſt ad planum recta, cùm ad rectas omnes lineas, à quibus illa tangitur, quæque in propoſito ſunt plano, rectos angulos efficit.

δ

Ἐπίπεδον πρὸς ἐπίπεδον ὀρθόν ἐστιν, ὅταν αἱ τῇ κοινῇ τομῇ τῶν ἐπιπέδων πρὸς ὀρθὰς ἀγόμεναι εὐθεῖαι ἐν ἑνὶ τῶν ἐπιπέδων, τῷ λοιπῷ ἐπιπέδῳ πρὸς ὀρθὰς ὦσιν.

4

Planum ad planum rectum eſt, cùm rectæ lineæ, quæ communi planorum ſectioni ad rectos angulos in vno planorũ ducuntur, alteri plano ad rectos ſunt angulos.

ε

Εὐθείας πρὸς ἐπίπεδον κλίσις ἐστίν, ὅταν ἀπὸ τοῦ μετεώρου πέρατος τῆς εὐθείας ἐπὶ τὸ ἐπίπεδον κάθετος ἀχθῇ, καὶ ἀπὸ τοῦ γενομένου σημείου, ἐπὶ τὸ ἀπὸ τοῦ ἐν τῷ ἐπιπέδῳ πέρατος τῆς εὐθείας, εὐθεῖα

ἐπιζευχθῇ, ἡ περιεχομένη ὀξεῖα· γωνία ὑπὸ τῆς ἀχθείσης καὶ τῆς ἐφεστώσης.

5

Rectæ lineæ ad planum inclinatio, acutus eſt angulus ipſa inſiſtēte linea & adiuncta altera comprehenſus, cùm à ſublimi rectæ illius lineę termino deducta fuerit perpēdicularis, atque à puncto quod perpendicularis in ipſo plano fecerit, ad propoſitæ illius lineæ extremum, quod in eodem eſt plano, altera recta linea fuerit adiuncta.

ϛ

Ἐπιπέδου πρὸς ἐπίπεδον κλίσις ἐστίν, ἡ περιεχομένη ὀξεῖα γωνία ὑπὸ τῶν πρὸς ὀρθὰς τῇ κοινῇ τομῇ ἀγομένων πρὸς τῷ αὐτῷ σημείῳ ἐν ἑκατέρῳ τῶν ἐπιπέδων.

6

Plani ad planum inclinatio, acutꝰ eſt angulus rectis lineis cōtentus, quæ in vtroque planorum ad idem cōmunis ſectionis punctum ductæ, rectos ipſi ſectioni angulos efficiunt.

ζ

Ἐπίπεδον πρὸς ἐπίπεδον ὁμοίως κεκλίσθαι λέγεται, καὶ ἕτερον πρὸς ἕτερον, ὅταν αἱ εἰρημέναι τῶν κλίσεων γωνίαι ἴσαι ἀλλήλαις ὦσι.

7

Planum similiter inclinatum esse ad planum, atque alterum ad alterum dicitur, cùm dicti inclinationum anguli inter se sunt equales.

η

Παράλληλα ἐπίπεδά ἐστι τὰ ἀσύμπτωτα.

8

Parallela plana, sunt quę eodem non incidunt, nec concurrunt.

θ

Ὅμοια στερεὰ σχήματά ἐστι, τὰ ὑπὸ ὁμοίων ἐπιπέδων περιεχόμενα ἴσων τὸ πλῆθος.

9

Similes figuræ solidæ, sunt quæ similibus planis, multitudine æqualibus continentur.

ι

Ἴσα δὲ καὶ ὅμοια στερεὰ σχήματά ἐστι, τὰ ὑπὸ ὁμοίων ἐπιπέδων περιεχόμενα ἴσων τῷ πλήθει καὶ τῷ μεγέθει.

10

Æquales & similes figuræ solidæ sunt, quæ similibus planis, multitudine & magnitudine æqualibus continentur.

ια

Στερεὰ γωνία ἐστὶν, ἡ ὑπὸ πλειόνων ἢ δύο γραμ-

μῶν ἁπτομένων ἀλλήλων καὶ μὴ ἐν τῇ αὐτῇ ἐπιφανείᾳ οὐσῶν, πρὸς πάσαις ταῖς γραμμαῖς κλίσις.

11

Solidus angulus, eſt plurium quàm duarum linearum, quæ ſe mutuò contingãt, nec in eadem ſint ſuperficie, ad omnes lineas inclinatio.

Ἄλλως.

Στερεὰ γωνία ἐστίν, ἡ ὑπὸ πλειόνων ἢ δύο ἐπιπέδων γωνιῶν περιεχομένη, μὴ οὐσῶν ἐν τῷ αὐτῷ ἐπιπέδῳ, πρὸς ἑνὶ σημείῳ συνισταμένων.

Aliter.

Solidus angulus, eſt qui pluribus quàm duobus planis angulis in eodem non conſiſtentibus plano, ſed ad vnum punctum collectis, continetur.

ιβ

Πυραμίς ἐστι σχῆμα στερεὸν ἐπιπέδοις περιεχόμενον, ἀπὸ ἑνὸς ἐπιπέδου πρὸς ἑνὶ σημείῳ συνεστώς.

12

Pyramis, eſt figura ſolida quæ planis continetur, ab vno plano ad vnum punctum collecta.

ιγ

Πρίσμα ἐστὶ σχῆμα στερεὸν ἐπιπέδοις περιεχόμενον, ὧν δύο τὰ ἀπεναντίον ἴσα τε καὶ ὅμοιά ἐστι, καὶ παράλληλα, τὰ δὲ λοιπὰ παραλληλόγραμμα.

13

Prisma, figura est solida quæ planis continetur, quorum aduersa duo sunt & æqualia & similia & parallela, alia verò parallelogramma.

ιδ

Σφαῖρά ἐστιν, ὅταν ἡμικυκλίου μενούσης τῆς διαμέτρου, περιενεχθὲν τὸ ἡμικύκλιον, εἰς τὸ αὐτὸ πάλιν ἀποκατασταθῇ ὅθεν ἤρξατο φέρεσθαι, τὸ περιληφθὲν σχῆμα.

14

Sphæra est figura, quæ conuerso circum quiescētem diametrum semicirculo continetur, cùm in eundem rursus locum restitutus fuerit, vnde moueri cœperat.

ιε

Ἄξων δὲ τῆς σφαίρας ἐστὶν, ἡ μένουσα εὐθεῖα, περὶ ἣν τὸ ἡμικύκλιον στρέφεται.

15

Axis autē sphæræ, est quiescens illa linea circum quam semicirculus conuertitur.

ις

Κέντρον δὲ τῆς σφαίρας ἐστὶ τὸ αὐτὸ, ὃ καὶ τοῦ ἡμικυκλίου.

16

Centrum verò Sphæræ est idem, quod & semicirculi.

ιζ

Διάμετρος δὲ τῆς σφαίρας ἐστὶν, εὐθεῖά τις διὰ τοῦ κέντρου ἠγμένη, καὶ περατουμένη ἐφ' ἑκάτερα τὰ μέρη ὑπὸ τῆς ἐπιφανείας τῆς σφαίρας.

17

Diameter autem Sphæræ, eſt recta quædam linea per centrum ducta, & vtrinquè à ſphæræ ſuperficie terminata.

ιη

Κῶνός ἐστιν, ὅταν ὀρθογωνίου τριγώνου μενούσης πλευρᾶς τῆς περὶ τὴν ὀρθὴν γωνίαν, περιενεχθὲν τὸ τρίγωνον εἰς τὸ αὐτὸ πάλιν ἀποκατασταθῇ ὅθεν ἤρξατο φέρεσθαι, τὸ περιληφθὲν σχῆμα. κἂν μὲν ἡ μένουσα εὐθεῖα ἴση ᾖ τῇ λοιπῇ τῇ περὶ τὴν ὀρθὴν περιφερομένῃ, ὀρθογώνιος ἔσται κῶνος· ἐὰν δὲ ἐλάττων, ἀμβλυγώνιος· ἐὰν δὲ μείζων, ὀξυγώνιος.

18

Cωnus eſt figura, quæ conuerſo circum quieſcens alterum latus eorum quæ rectum angulum continent, orthogωnio triangulo continetur, cùm in eundem rurſus locum illud triãgulum reſtitutum fuerit, vnde moueri cœperat. Atque ſi quieſcens recta linea æqualis ſit alteri, quæ circum rectum angulum cõuertitur, rectangulus erit Cωnus: ſin minor, amblygωnius: ſi verò maior, oxygωnius.

ιθ

Ἄξων δὲ τοῦ κώνου ἐστὶν ἡ μένουσα, περὶ ἣν τὸ τρίγωνον στρέφεται.

19

Axis autem Cωni, eſt quieſcēs illa linea, circum quam triangulum vertitur.

κ

Βάσις δὲ, ὁ κύκλος ὁ ὑπὸ τῆς περιφερομένης εὐθείας γραφόμενος.

20

Baſis vero Cωni, circulus eſt qui a circunducta linea recta deſcribitur.

κα

Κύλινδρος δὲ, ὅταν ὀρθογωνίου παραλληλογράμμου μενούσης μιᾶς πλευρᾶς τῶν περὶ τὴν ὀρθὴν, περιενεχθὲν τὸ παραλληλόγραμμον εἰς τὸ αὐτὸ πάλιν ἀποκατασταθῇ, ὅθεν ἤρξατο φέρεσθαι, τὸ περιληφθὲν σχῆμα.

21

Cylindrus figura eſt, quæ conuerſo circum quieſcens alterum latus eorum quę rectum angulum continēt, parallelogrāmo orthogωnio comprehenditur, cùm in eundem rurſus locum reſtitutum fuerit illud parallelogrammum, vnde moueri cœperat.

κβ

Ἄξων δὲ τοῦ κυλίνδρου ἐστὶν ἡ μένουσα εὐθεῖα, περὶ

ἣν τὸ παραλληλόγραμμον στρέφεται.

22

Axis autem Cylindri, est quiescens illa recta linea, circum quam parallelogrammum vertitur.

κγ

Βάσεις δὲ, οἱ κύκλοι οἱ ὑπὸ τῶν ἀπεναντίον περιαγομένων δύο πλευρῶν γραφόμενοι.

23

Bases verò cylindri, sunt circuli à duobus aduersis lateribus quæ circumaguntur, descripti.

κδ

Ὅμοιοι κῶνοι καὶ κύλινδροί εἰσιν, ὧν οἵτε ἄξονες καὶ αἱ διάμετροι τῶν βάσεων ἀνάλογόν εἰσιν.

24

Similes coni & cylindri, sunt quorum & axes & basium diametri proportionales sunt.

κε

Κύβος ἐστὶ σχῆμα στερεὸν, ὑπὸ ἓξ τετραγώνων ἴσων περιεχόμενον.

25

Cubus est figura solida, quæ sex quadratis æqualibus continetur.

κς

Τετράεδρόν ἐστι σχῆμα ὑπὸ τεττάρων τριγώνων

ἴσων καὶ ἰσοπλεύρων περιεχόμενον.

26

Tetraëdrum est figura, quæ triangulis quatuor æqualibus & æquilateris continetur.

κζ

ὀκτάεδρόν ἐστι σχῆμα στερεὸν ὑπὸ ὀκτὼ τριγώνων ἴσων καὶ ἰσοπλεύρων περιεχόμενον.

27

Octaëdrum figura est solida, quæ octo triangulis æqualibus & æquilateris continetur.

κη

Δωδεκάεδρόν ἐστι σχῆμα στερεὸν ὑπὸ δώδεκα πενταγώνων ἴσων, καὶ ἰσοπλεύρων, καὶ ἰσογωνίων περιεχόμενον.

28

Dodecaëdrũ figura est solida, quæ duodecim pentagonis æqualibus, æquilateris, & æquiangulis continetur.

κθ

Εἰκοσάεδρόν ἐστι σχῆμα στερεὸν ὑπὸ εἴκοσι τριγώνων ἴσων καὶ ἰσοπλεύρων περιεχόμενον.

29

Eicosaëdrum figura est solida, quæ triangulis viginti æqualibus & æquilateris cõtinetur.

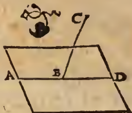
Προτάσεις.

προτάσεις.

α

Εὐθείας γραμμῆς μέρος μέν τι οὐκ ἔστιν ἐν τῷ ὑποκειμένῳ ἐπιπέδῳ, μέρος δέ τι ἐν τῷ μετεώρῳ.

Theor.1.Propo.1.

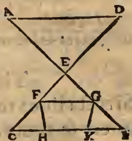


Quædã rectæ lineæ pars in subiecto quidem non est plano, quædam verò in sublimi.

β

Ἐὰν δύο εὐθεῖαι τέμνωσιν ἀλλήλας, ἐν ἑνί εἰσιν ἐπιπέδῳ, καὶ πᾶν τρίγωνον ἐν ἑνί ἐστιν ἐπιπέδῳ.

Theor.2.Propo.2.

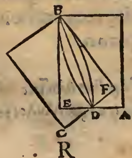


Si duæ rectæ lineæ se mutuò secẽt, in vno sunt plano: atque triangulum omne in vno est plano.

γ

Ἐὰν δύο ἐπίπεδα τέμνῃ ἄλληλα, ἡ κοινὴ αὐτῶν τομὴ εὐθεῖά ἐστι.

Theor.3.Propositio.3.



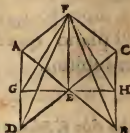
Si duo plana se mutuò secent; communis eorum sectio est recta linea.

δ

Ἐὰν εὐθεῖα δύο εὐθείαις τεμνούσαις ἀλλήλας, πρὸς ὀρθὰς ἐπὶ τῆς κοινῆς τομῆς ἐπισταθῇ, καὶ τῷ δι᾽ αὐτῶν ἐπιπέδῳ πρὸς ὀρθὰς ἔσται.

Theor.4.Prop.4.

Si recta linea rectis duabus lineis ſe mutuò ſecãtibus, in cõmuni ſectione ad rectos angulos inſiſtat illa ducto etiã per ipſas plano ad angulos rectos erit.

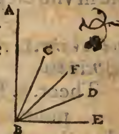


ε

Ἐὰν εὐθεῖα τρισὶν εὐθείαις ἁπτομέναις ἀλλήλων, πρὸς ὀρθὰς ἐπὶ τῆς κοινῆς τομῆς ἐπισταθῇ, αἱ τρεῖς εὐθεῖαι ἐν ἑνί εἰσιν ἐπιπέδῳ.

Theor.5.Prop.5.

Si recta linea rectis tribus lineis ſe mutuò tangẽtibus, in communi ſectione ad rectos ãgulos inſiſtat, illę tres rectæ in vno ſunt plano.

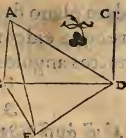


ς

Ἐὰν δύο εὐθεῖαι τῷ αὐτῷ ἐπιπέδῳ πρὸς ὀρθὰς ὦσι, παράλληλοι ἔσονται αἱ εὐθεῖαι.

Theor. 6. Propo. 6.

Si duæ rectæ lineæ eidem plano ad rectos sint angulos, parallelæ erunt illæ rectæ lineæ.

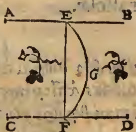


ζ

Ἐὰν ὦσι δύο εὐθεῖαι παράλληλοι, ληφθῇ δὲ ἐφ' ἑκατέρας αὐτῶν τυχόντα σημεῖα, ἡ ἐπὶ τὰ σημεῖα ἐπιζευγνυμένη εὐθεῖα, ἐν τῷ αὐτῷ ἐπιπέδῳ ἐστὶ ταῖς παραλλήλοις.

Theor. 7. Propo. 7.

Si duæ sint parallelæ rectæ lineæ, in quarum vtraque sumpta sint quęlibet pūcta, illa linea quæ ad hęc puncta adiungitur, in eodem est cum parallelis plano.



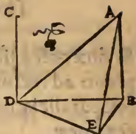
η

Ἐὰν ὦσι δύο εὐθεῖαι παράλληλοι, ἡ δὲ ἑτέρα αὐτῶν ἐπιπέδῳ τινὶ πρὸς ὀρθὰς ᾖ, καὶ ἡ λοιπὴ τῷ αὐτῷ ἐπιπέδῳ πρὸς ὀρθὰς ἔσται.

Theor. 8. Propo. 8.

Si duæ sint parallelæ rectæ lineæ, qua-

rum altera ad rectos cuidam plano sit angulos, & reliqua eidem plano ad rectos angulos erit.

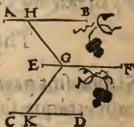


9

Αἱ τῇ αὐτῇ εὐθείᾳ παράλληλοι, καὶ μὴ οὖσαι αὐτῇ ἐν τῷ αὐτῷ ἐπιπέδῳ, καὶ ἀλλήλαις εἰσὶ παράλληλοι.

Theor.9.Propo.9.

Quæ eidem rectæ lineæ sunt parallelæ, sed non in eodem cum illa plano, hę quoque sunt inter se parallelæ.

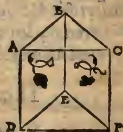


ι

Ἐὰν δύο εὐθεῖαι ἁπτόμεναι ἀλλήλων παρὰ δύο εὐθείας ἁπτομένας ἀλλήλων ὦσι, μὴ ἐν τῷ αὐτῷ ἐπιπέδῳ, ἴσας γωνίας περιέξουσι.

Theor.10.Proposi.10.

Si duæ rectæ lineæ se mutuò tangentes ad duas rectas se mutuò tangentes sint parallelæ, non autem in eodem plano, illæ angulos æquales compreheͬdent.

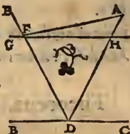


ια

Ἀπὸ τοῦ δοθέντος σημείου μετεώρου, ἐπὶ τὸ ὑποκείμενον ἐπίπεδον κάθετον εὐθεῖαν γραμμὴν ἀγαγεῖν.

Probl.1.Propo.11.

A dato ſublimi puncto, in ſubiectum planum perpendicularem rectam lineam ducere.



ιβ

Τῷ δοθέντι ἐπιπέδῳ, ἀπὸ τοῦ πρὸς αὐτῷ δοθέντος σημείου, πρὸς ὀρθὰς εὐθεῖαν γραμμὴν ἀναστῆσαι.

Probl.2.Propo.12.

Dato plano, à puncto quod in illo datum eſt, ad rectos angulos rectam lineam excitare.

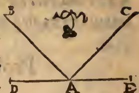


ιγ

Τῷ δοθέντι ἐπιπέδῳ, ἀπὸ τοῦ πρὸς αὐτῷ σημείου, δύο εὐθεῖαι πρὸς ὀρθὰς οὐκ ἀναστήσονται ἐπὶ τὰ αὐτὰ μέρη.

Theor.11.Propo.13.

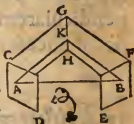
Dato plano, à puncto quod in illo datum est, duæ rectæ lineæ ad rectos angulos non excitabuntur ad easdem partes.



ιδ

Πρὸς ἃ ἐπίπεδα ἡ αὐτὴ εὐθεῖα ὀρθή ἐστι, παράλληλά ἐστι τὰ ἐπίπεδα.

Theore.12.Propo.14.



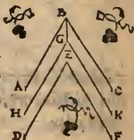
Ad quæ plana, eadem recta linea recta est, illa sunt parallela.

ιε

Ἐὰν δύο εὐθεῖαι ἁπτόμεναι ἀλλήλων, παρὰ δύο εὐθείας ἁπτομένας ἀλλήλων ὦσι μὴ ἐν τῷ αὐτῷ ἐπιπέδῳ οὖσαι, παράλληλά ἐστι τὰ δι' αὐτῶν ἐπίπεδα.

Theor.13.Propo.15.

Si duæ rectæ lineæ se mutuò tangentes ad duas rectas se mutuò tangentes sint parallelæ, non in eodem consistentes plano, parallela sunt quæ per illas ducuntur plana.

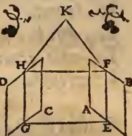


ιε

Ἐὰν δύο ἐπίπεδα παράλληλα ὑπὸ ἐπιπέδου τινὸς τέμνηται, αἱ κοιναὶ αὐτῶν τομαὶ παράλληλοί εἰσι.

Theor.14.Propo.16.

Si duo plana parallella plano quopiam ſecẽtur, cõmunes illorum ſectiones ſunt parallelæ.

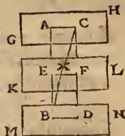


ιζ

Ἐὰν δύο εὐθεῖαι ὑπὸ παραλλήλων ἐπιπέδων τέμνωνται, εἰς τοὺς αὐτοὺς λόγους τμηθήσονται.

Theor.15.Propo.17.

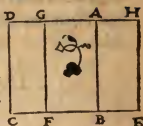
Si duę rectæ lineæ parallelis planis ſecentur, in eaſdem rationes ſecabuntur.



ιη

Ἐὰν εὐθεῖα ἐπιπέδῳ τινὶ πρὸς ὀρθὰς ᾖ, καὶ πάντα τὰ δι' αὐτῆς ἐπίπεδα τῷ αὐτῷ ἐπιπέδῳ πρὸς ὀρθὰς ἔσται.

Theor. 16. Propo. 18.

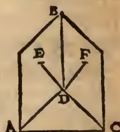


Si recta linea plano cuipiam ad rectos sit angulos, illa etiam omnia quæ per ipsam plana, ad rectos eidem plano angulos erunt.

ιθ

Ἐὰν δύο ἐπίπεδα τέμνοντα ἄλληλα ἐπιπέδῳ τινὶ πρὸς ὀρθὰς ᾖ, καὶ ἡ κοινὴ αὐτῶν τομὴ τῷ αὐτῷ ἐπιπέδῳ πρὸς ὀρθὰς ἔσται.

Theor. 17. Propo. 19.

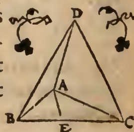


Si duo plana se mutuò secantia plano cuidam ad rectos sint angulos, communis etiam illorum sectio ad rectos eidem plano angulos erit.

κ

Ἐὰν στερεὰ γωνία ὑπὸ τριῶν γωνιῶν ἐπιπέδων περιέχηται, δύο ὁποιαιοῦν τῆς λοιπῆς μείζονές εἰσι πάντῃ μεταλαμβανόμεναι.

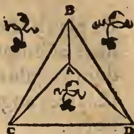
Theor. 18. Propo. 20.



Si angulus solidus planis tribus angulis contineatur, ex his duo quilibet vtut assumpti tertio sunt maiores.

κα

Ἅπασα στερεὰ γωνία ὑπὸ ἐλασσόνων ἢ τεσσάρων ὀρθῶν γωνιῶν ἐπιπέδων περιέχεται.



Theor. 19. Propositio.21.

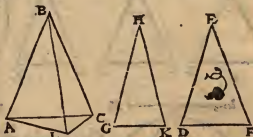
Solidus omnis angulus minoribus cõtinetur, quã rectis quatuor ãgulis planis.

κβ

Ἐὰν ὦσι τρεῖς γωνίαι ἐπίπεδοι, ὧν αἱ δύο τῆς λοιπῆς μείζονές εἰσι, πάντῃ μεταλαμβανόμεναι, περιέχωσι δὲ αὐτὰς ἴσαι εὐθεῖαι, δυνατόν ἐστιν ἐκ τῶν ἐπιζευγνυουσῶν τὰς ἴσας εὐθείας τρίγωνον συστήσασθαι.

Theor.20.Propo. 22.

Si plani tres anguli æqualibus rectis contineantur lineis, quorum duo vt libet assumpti tertio sint maiores, triangulũ constitui potest ex lineis æquales illas rectas cõiungentibus.



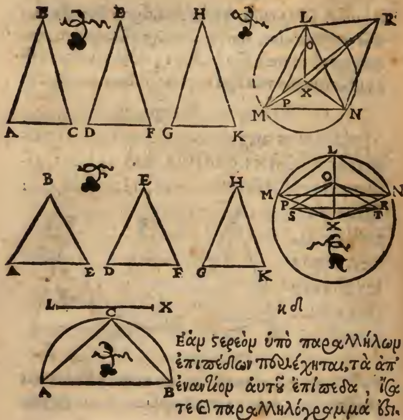
κγ

Ἐκ τριῶν γωνιῶν ἐπιπέδων, ὧν αἱ δύο τῆς λοιπῆς μείζονές εἰσι, πάντῃ μεταλαμβανόμεναι, στερεὰν

γωνίαν συστήσασθαι. δεῖ δὴ τὰς τρεῖς τεσσάρων ὀρθῶν ἐλάσσονας εἶναι.

Probl.3. Propo.23.

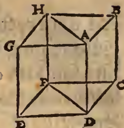
Ex planis tribus angulis, quorum duo vt libet aſſumpti tertio ſint maiores, ſolidum angulum conſtituere. Decet autem illos tres angulos rectis quatuor eſſe minores.



κδ

Ἐὰν στερεὸν ὑπὸ παραλλήλων ἐπιπέδων περιέχηται, τὰ ἀπεναντίον αὐτοῦ ἐπίπεδα, ἴσα τε καὶ παραλληλόγραμμά ἐστι.

Theor. 21. Propo. 24.

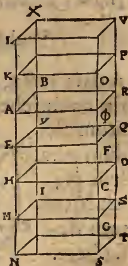


Si solidum parallelis planis contineatur, aduersa illi⁹ plana & æqualia sunt & parallelogramma.

κε

Ἐὰν στερεὸν παραλληλεπίπεδον ἐπιπέδῳ τμηθῇ παραλλήλῳ ὄντι τοῖς ἀπεναντίον ἐπιπέδοις, ἔσται ὡς ἡ βάσις πρὸς τὴν βάσιν, οὕτω τὸ στερεὸν πρὸς τὸ στερεόν.

Theor. 22. Proposit. 25.



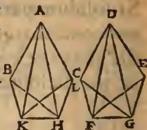
Si solidum parallelis planis contentum plano secetur aduersis planis parallelo, erit quemadmodum basis ad basim, ita solidum ad solidum.

κϛ

Πρὸς τῇ δοθείσῃ εὐθείᾳ καὶ τῷ πρὸς αὐτῇ σημείῳ, τῇ δοθείσῃ στερεᾷ γωνίᾳ ἴσην στερεὰν γωνίαν συστήσασθαι.

Probl. 4. Propositio.26.

Ad datã rectam lineam eiúsque punctum, angulum solidum constituere solido angulo dato æqualem.

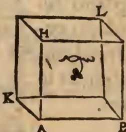


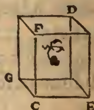
κζ

Ἀπὸ τῆς δοθείσης εὐθείας, τῷ δοθέντι στερεῷ παραλληλεπιπέδῳ ὅμοιόν τε καὶ ὁμοίως κείμενον στερεὸν παραλληλεπίπεδον ἀναγράψαι.

Probl.5.Propositio.27.

A data recta, dato solido parallelis planis comprehenso simile & similiter positum solidum parallelis planis cõtentum describere.



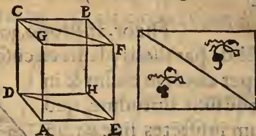


κη

Ἐὰν στερεὸν παραλληλεπίπεδον ἐπιπέδῳ τμηθῇ κατὰ τὰς διαγωνίους τῶν ἀπεναντίον ἐπιπέδων, δίχα τμηθήσεται τὸ στερεὸν ὑπὸ τοῦ ἐπιπέδου.

Theor. 23. Propo. 28.

Si ſolidum parallelis planis compreheſum, ducto per aduerſorum planorum diagωnios plano ſectum ſit, illud ſolidũ ab hoc plano bifariam ſecabitur.

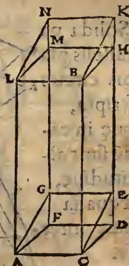


κθ

Τὰ ἐπὶ τῆς αὐτῆς βάσεως ὄντα στερεὰ παραλληλεπίπεδα, καὶ ὑπὸ τὸ αὐτὸ ὕψος, ὧν αἱ ἐφεστῶσαι ἐπὶ τῶν αὐτῶν εἰσὶν εὐθειῶν, ἴσα ἀλλήλοις ἐστίν.

Theör. 24. Propoſitio, 29.

Solida parallelis planis comprehenſa, quæ ſuper eandem baſim & in eadem ſunt altitudine, quorum inſiſtentes lineæ in iiſdem collocantur rectis lineis, illa ſunt inter ſe æqualia.

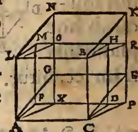


λ

Τὰ ἐπὶ τῆς αὐτῆς βάσεως ὄντα στερεὰ παραλληλεπίπεδα, καὶ ὑπὸ τὸ αὐτὸ ὕψος, ὧν αἱ ἐφεστῶσαι οὐκ εἰσὶν ἐπὶ τῶν αὐτῶν εὐθειῶν, ἴσα ἀλλήλοις ἐστί.

Theor.25.Propo.30.

Solida parallelis planis circũſcripta, quæ ſuper eandem baſim & in eadẽ ſunt altitudine, quorum inſiſtẽtes lineæ non in iiſdem reperiuntur rectis lineis, illa ſunt inter ſe æqualia.

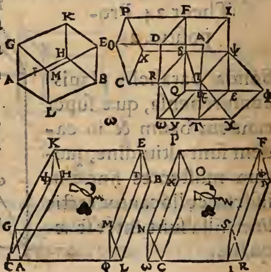


λα

Τὰ ἐπὶ ἴσων βάσεων ὄντα στερεὰ παραλληλεπίπεδα, καὶ ὑπὸ τὸ αὐτὸ ὕψος, ἴσα ἀλλήλοις ἐστίν.

Theor.26.Propoſi.31.

Solida parallelis planis circunſcripta, quę in eadẽ ſunt altitudine, æqualia ſunt inter ſe.

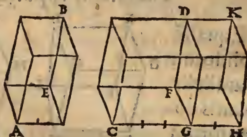


λϐ

Τὰ ὑπὸ τ' αὐτὸ ὕψος ὄντα στερεὰ παραλληλεπίπεδα, πρὸς ἄλληλά ἐστιν, ὡς αἱ βάσεις.

Theor.27.Propo.32.

Solida parallelis planis circũſcripta quæ eiuſdem ſunt altitudinis, eam habent inter ſe rationem, quam baſes.

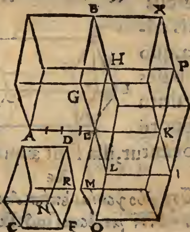


λγ

Τὰ ὅμοια στερεὰ παραλληλεπίπεδα, πρὸς ἄλληλα ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ὁμολόγων πλευρῶν.

Theor.28.Propo.33.

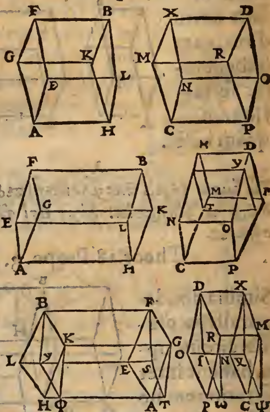
Similia ſolida parallelis planis circũſcripta habent inter ſe rationem homologorum laterum triplicatam.



λδ

Τῶν ἴσων στερεῶν παραλληλεπιπέδων ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσι· καὶ ὧν στερεῶν παραλληλεπιπέδων ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσιν, ἴσα ἐστὶν ἐκεῖνα.

Theor.29.Propo.34.



Æqualiũ ſolidorum parallelis planis cõtentorum baſes cum altitudini bus reciprocãtur. Et ſolida parallelis planis cõtenta, quo rum baſes cum altitu dinibus re ciprocantur, illa ſunt æqualia.

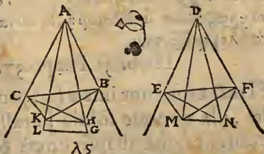
λε

Ἐὰν ὦσι δύο γωνίαι ἐπίπεδοι ἴσαι, ἀπὸ δὲ τῶν κορυφῶν αὐτῶν μετέωροι εὐθεῖαι ἐπισταθῶσιν ἴσας γωνίας

γωνίας περιέχουσι μετὰ τῶν ἐξ ἀρχῆς εὐθειῶν, ἑκατέραν ἑκατέρα, ἐπὶ δὲ τῶν μετεώρων ληφθῇ τυχόντα σημεῖα, καὶ ἀπ' αὐτῶν ἐπὶ τὰ ἐπίπεδα, ἐν οἷς εἰσὶν αἱ ἐξ ἀρχῆς γωνίαι, κάθετοι ἀχθῶσιν, ἀπὸ δὲ τῶν γενομένων σημείων ὑπὸ τῶν καθέτων ἐπὶ τοῖς ἐπιπέδοις, ἐπὶ τὰς ἐξ ἀρχῆς γωνίας ἐπιζευχθῶσιν εὐθεῖαι, ἴσας γωνίας περιέξουσι μετὰ τῶν μετεώρων.

Theor.30.Propoſi.35.

Si duo plani ſint anguli æquales, quorum verticibus ſublimes rectę lineæ inſiſtant, quæ cum lineis primò poſitis angulos cõtineāt æquales, vtrũque vtrique, in ſublimibus autem lineis quælibet ſumpta ſint puncta, & ab his ad plana in quibus conſiſtunt anguli primùm poſiti, ductæ ſint perpendiculares, ab earum verò punctis, quæ in planis ſignata fuerint, ad angulos primùm poſitos adiunctæ ſint rectæ lineæ, hæ cũ ſublimibus æquales angulos comprehēdēt.



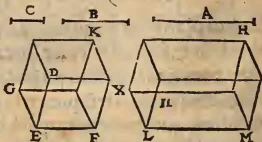
λς

Ἐὰν τρεῖς εὐθεῖαι ἀνάλογον ὦσι, τὸ ἐκ τῶν τριῶν στε-

ρεὸν παραλληλεπίπεδον ἴσον ἐστὶ τῷ ἀπὸ τῆς μέσης στερεῷ παραλληλεπιπέδῳ, ἰσοπλεύρῳ μὲν, ἰσογωνίῳ δὲ τῷ προειρημένῳ.

Theor.31.Propo.36.

Si rectæ tres lineæ ſint proportionales, quod ex his tribus fit ſolidum parallelis planis contentum, ęquale eſt deſcripto à media linea ſolido parallelis planis comprehenſo, quod æquilaterum quidē ſit, ſed antedicto æquiangulum.



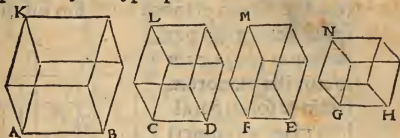
λζ

Ἐὰν τέσσαρες εὐθεῖαι ἀνάλογον ὦσι, καὶ τὰ ἀπ' αὐτῶν παραλληλεπίπεδα ὅμοιά τε καὶ ὁμοίως ἀναγραφόμενα, ἀνάλογον ἔσται· καὶ ἐὰν τὰ ἀπ' αὐτῶν στερεὰ παραλληλεπίπεδα ὅμοιά τε καὶ ὁμοίως ἀναγραφόμενα ἀνάλογον ᾖ, καὶ αὐταὶ αἱ εὐθεῖαι ἀνάλογον ἔσονται.

Theor.32.Propo.37.

Si rectæ quatuor lineæ ſint proportionales, illa quoque ſolida parallelis planis contenta, quæ ab ipſis lineis & ſimilia & ſimiliter deſcribuntur, proportionalia e-

runt. Et si solida parallelis planis comprehensa, quæ & similia & similiter describuntur, sint proportionalia, illę quoque rectę lineę proportionales erunt.

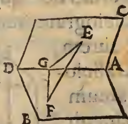


λη

Ἐὰν ἐπίπεδον πρὸς ἐπίπεδον ὀρθὸν ᾖ, καὶ ἀπό τινος σημείου τῶν ἐν ἑνὶ τῶν ἐπιπέδων ἐπὶ τὸ ἕτερον ἐπίπεδον κάθετος ἀχθῇ, ἐπὶ τῆς κοινῆς τομῆς πεσεῖται τῶν ἐπιπέδων ἡ ἀγομένη κάθετος.

Theor.33. Propo.38.

Si planum ad planum rectum sit, & à quodam puncto eorum quæ in vno sunt planorũ perpendicularis ad alterum ducta sit, illa quę ducitur perpendicularis, in communem cadet planorum sectionem.



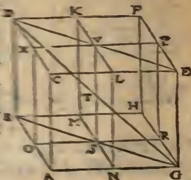
λθ

Ἐὰν στερεοῦ παραλληλεπιπέδου τῶν ἀπεναντίον ἐπιπέδων αἱ πλευραὶ δίχα τμηθῶσι, διὰ δὲ τῶν τομῶν ἐπίπεδα ἐκβληθῇ, ἡ κοινὴ τομὴ τῶν ἐπιπέδων

καὶ ἡ τοῦ στερεοῦ παραλληλεπιπέδου διάμετρος, δίχα τέμνουσιν ἀλλήλας.

Theor. 34. Propo. 39.

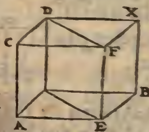
Si in solido parallelis planis circũscripto, aduersorum planorũ lateribus bifariã sectis, educta sint per sectiones plana, communis illa planorum sectio & solidi parallelis plani circunscripti diameter, se mutuò bifariam secant.

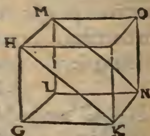


Ἐὰν ᾖ δύο πρίσματα ἰσοϋψῆ, καὶ τὸ μὲν ἔχῃ βάσιν παραλληλόγραμμον, τὸ δὲ τρίγωνον, διπλάσιον δὲ ᾖ τὸ παραλληλόγραμμον τοῦ τριγώνου, ἴσα ἔσται τὰ πρίσματα.

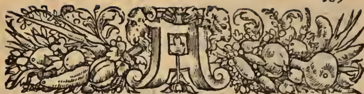
Theor. 35. Propo. 40.

Si duo sint æqualis altitudinis prismata, quorum hoc quidem basim habeat parallelogrammum, illud verò triangulum, sit autem parallelogrãmum trianguli dı ... m, il ... qualia.





... ementi vndecimi finis.



ΕΥ'ΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙ͂ΩΝ ΙΒ
ΚΑῚ ΣΤΕΡΕΩ͂Ν
ΔΕΥ'ΤΕΡΟΝ.

EVCLIDIS ELEMENTVM DVODECIMVM, ET SOLIDORVM SECVNDVM.

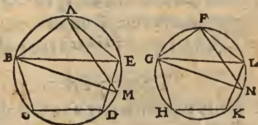
Προτάσεις.

α

Τὰ ἐν τοῖς κύκλοις ὅμοια πολύγωνα πρὸς ἄλληλά ἐστιν, ὡς τὰ ἀπὸ τῶν διαμέτρων τετράγωνα.

Theor.1. Propo.1.

Similia, quæ ſunt in circulis polygωna, ratioñe habent inter ſe quã deſcripta à diametris quadrata.

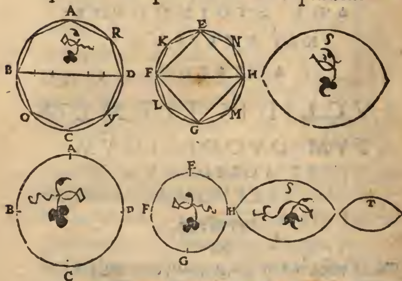


β

Οἱ κύκλοι πρὸς ἀλλήλους εἰσίν, ὡς τὰ ἀπὸ τῶν διαμέτρων τετράγωνα.

Theor.2.Propo.2.

Circuli eam inter ſe rationem habent, quam deſcripta à diametris quadrata.



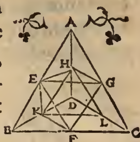
γ.

Πᾶσα πυραμὶς τρίγωνον ἔχουσα βάσιν, διαιρεῖται εἰς δύο πυραμίδας ἴσας τε καὶ ὁμοίας ἀλλήλαις, τριγώνους βάσεις ἐχούσας, καὶ ὁμοίας τῇ ὅλῃ, καὶ εἰς δύο πρίσματα ἴσα. καὶ τὰ δύο πρίσματα μείζονά ἐστιν, ἢ τὸ ἥμισυ τῆς ὅλης πυραμίδος.

Theor.3.Propo.3.

Omnis pyramis trigonam habens baſim, in duas diuiditur pyramidas non tantùm

æquales & ſimiles inter ſe,ſed toti etiam pyramidi ſimiles,quarum trigωnæ ſunt baſes , atque in duo priſmata æqualia, quæ duo priſmata dimidio pyramidis totius ſunt maiora.



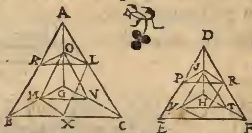
Δ

Ἐὰν ὦσι δύο πυραμίδες ὑπὸ τὸ αὐτὸ ὕψος, τριγώνους ἔχουσαι βάσεις, διαιρεθῇ δὲ ἑκατέρα αὐτῶν εἴς τε δύο πυραμίδας ἴσας ἀλλήλαις καὶ ὁμοίας τῇ ὅλῃ, καὶ εἰς δύο πρίσματα ἴσα, καὶ τῶν γενομένων πυραμίδων ἑκατέρα τὸν αὐτὸν τρόπον, καὶ τοῦτο ἀεὶ γίνηται, ἔστιν ὡς ἡ τῆς μιᾶς πυραμίδος βάσις, πρὸς τὴν τῆς ἑτέρας πυραμίδος βάσιν, οὕτως καὶ τὰ ἐν τῇ μιᾷ πυραμίδι πρίσματα πάντα, πρὸς τὰ ἐν τῇ ἑτέρᾳ πυραμίδι πρίσματα πάντα ἰσοπληθῆ.

Theor.4. Propo.4.

Si duæ eiuſdem altitudinis pyramides trigωnas habeant baſes,ſit autem illarum vtraque diuiſa & in duas pyramidas inter ſe æquales totique ſimiles , & in duo priſmata æqualia , ac eodē modo diuidatur vtraque pyramidum quæ ex ſuperiore diuiſione natæ ſunt , idque perpetuò fiat: quemadmodum ſe habet vnius pyrami-

dis basis ad alterius pyramidis basim, ita & omnia quę in vna pyramide prismata, ad omnia quę in altera pyramide, prismata multitudine æqualia.

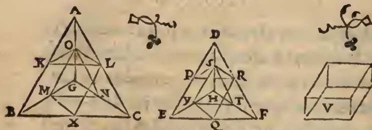


ε

Αἱ ὑπὸ τὸ αὐτὸ ὕψος οὖσαι πυραμίδες, καὶ τριγώνους ἔχουσαι βάσεις, πρὸς ἀλλήλας εἰσὶν ὡς αἱ βάσεις.

Theor.5. Propo.5.

Pyramides eiusdem altitudinis, quarum trigωnę sunt bases, eam inter se rationem habent quam ipsæ bases.

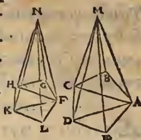


ς

Αἱ ὑπὸ τὸ αὐτὸ ὕψος οὖσαι πυραμίδες, καὶ πολυγώνους ἔχουσαι βάσεις, πρὸς ἀλλήλας εἰσὶν ὡς αἱ βάσεις.

Theor. 6. Propo. 6.

Pyramides eiuſdem altitudinis, quarum polygωnæ ſunt baſes, eam inter ſe rationem habēt quam ipſæ baſes.

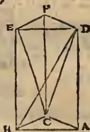


ζ

Πᾶν πρίσμα τρίγωνον ἔχον βάσιν, διαιρεῖται εἰς τρεῖς πυραμίδας ἴσας ἀλλήλαις, τριγώνους βάσεις ἐχούσας.

Theor. 7. Propo. 7.

Omne priſma trigωnā habens baſim, diuiditur in tres pyramidas inter ſe æquales, quarum trigωnæ ſunt baſes.

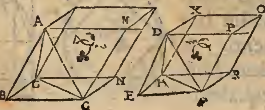


η

Αἱ ὅμοιαι πυραμίδες, καὶ τριγώνους ἔχουσαι βάσεις, ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ὁμολόγων πλευρῶν.

Theor. 8. Propo. 8.

Similes pyramides quæ trigωnas habent baſes, in triplicata ſunt homologorū laterum ratione.

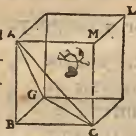


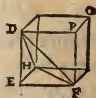
θ

Τῶν ἴσων πυραμίδων, καὶ τριγώνους βάσεις ἐχουσῶν ἀντιπεπόνθασιν αἱ βάσεις ταῖς ὕψεσι. καὶ ὧν πυραμίδων τριγώνους βάσεις ἐχουσῶν ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσιν, ἴσαι εἰσὶν ἐκεῖναι.

Theor.9.Propo.9.

Æqualium pyramidum & trigωnas bases habentium reciprocantur bases cum altitudinibus. Et quarum pyramidum trigωnas bases habentium reciprocantur bases cum altitudinibus, illæ sunt æquales.



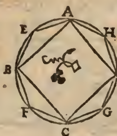


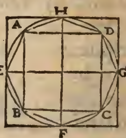
ι

Πᾶς κῶνος, κυλίνδρου τρίτον μέρος ἐστὶ τοῦ τὴν αὐτὴν βάσιν ἔχοντος αὐτῷ καὶ ὕψος ἴσον.

Theor.10.Propo.10.

Omnis cωnus tertia pars est Cylindri eandē cū ipso cωno basim habentis, & altitudinē æqualem.



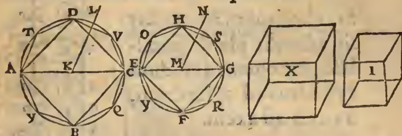


ια

οἱ ὑπὸ τὸ αὐτὸ ὕψος ὄντες κῶνοι καὶ κύλινδροι, πρὸς ἀλλήλους εἰσὶν ὡς αἱ βάσεις.

Theor.11.Propo.11.

Cωni & cylindri eiuſdẽ altitudinis, eam inter ſe rationem habent quam baſes.

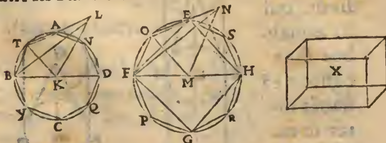


ιβ

οἱ ὅμοιοι κῶνοι καὶ κύλινδροι, ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ἐν ταῖς βάσεσι διαμέτρων.

Theor.12. Propo.12.

Similes cωni & cylindri, triplicatam habent inter ſe rationem diametrorum quę ſunt in baſibus.



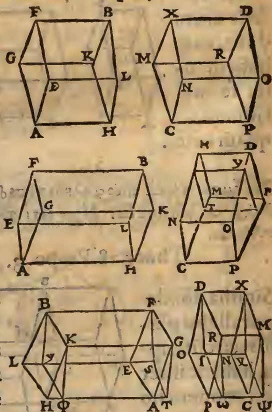
ιγ

Ἐὰν κύλινδρος ἐπιπέδῳ τμηθῇ παραλλήλῳ ὄντι τοῖς ἀπεναντίον ἐπιπέδοις, ἔσται ὡς ὁ κύλιν=

λδ

Τῶν ἴσων στερεῶν παραλληλεπιπέδων ἀντιπε-πόνθασιν αἱ βάσεις τοῖς ὕψεσι· καὶ ὧν στερεῶν πα-ραλληλεπιπέδων ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσιν, ἴσα ἐστὶν ἐκεῖνα.

Theor.29.Propo.34.



Æqualiũ solidorum parallelis planis cõtentorum bases cum altitudinibus reciprocãtur. Et solida parallelis planis cõtenta, quorum bases cum altitudinibus reciprocantur, illa sunt æqualia.

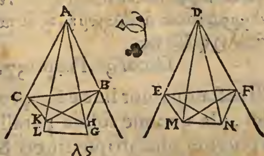
λε

Ἐὰν ὦσι δύο γωνίαι ἐπίπεδοι ἴσαι, ἐπὶ δὲ τῶν κο-ρυφῶν αὐτῶν μετέωροι εὐθεῖαι ἐπισταθῶσιν ἴσας γωνίας

γωνίας περιέχουσαι μετὰ τῶν ἐξ ἀρχῆς εὐθειῶν, ἑκατέραν ἑκατέρᾳ, ἐπὶ δὲ τῶν μετεώρων ληφθῇ τυχόντα σημεῖα, καὶ ἀπ' αὐτῶν ἐπὶ τὰ ἐπίπεδα, ἐν οἷς εἰσιν αἱ ἐξ ἀρχῆς γωνίαι, κάθετοι ἀχθῶσιν, ἀπὸ δὲ τῶν γενομένων σημείων ὑπὸ τῶν καθέτων ἐπὶ τοῖς ἐπιπέδοις, ἐπὶ τὰς ἐξ ἀρχῆς γωνίας ἐπιζευχθῶσιν εὐθεῖαι, ἴσας γωνίας περιέξουσι μετὰ τῶν μετεώρων.

Theor.30.Proposi.35.

Si duo plani ſint anguli æquales, quorum verticibus ſublimes rectę lineæ inſiſtant, quæ cum lineis primò poſitis angulos cõtineãt æquales, vtrũque vtrique, in ſublimibus autem lineis quælibet ſumpta ſint puncta, & ab his ad plana in quibus conſiſtunt anguli primùm poſiti, ductæ ſint perpendiculares, ab earum verò punctis, quæ in planis ſignata fuerint, ad angulos primùm poſitos adiunctæ ſint rectæ lineæ, hæ cũ ſublimibus æquales angulos comprehẽdẽt.

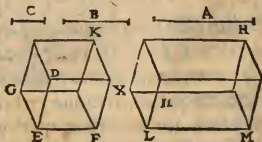


ἐὰν τρεῖς εὐθεῖαι ἀνάλογον ὦσι, τὸ ἐκ τῶν τριῶν στε-

ρεὸν παραλληλεπίπεδον ἴσον ἐστὶ τῷ ἀπὸ τῆς μέσης στερεῷ παραλληλεπιπέδῳ, ἰσοπλεύρῳ μὲν, ἰσογωνίῳ δὲ τῷ προειρημένῳ.

Theor.31.Propo.36.

Si rectæ tres lineæ ſint proportionales, quod ex his tribus fit ſolidum parallelis planis contentum, ęquale eſt deſcripto à media linea ſolido parallelis planis comprehenſo, quod æquilaterum quidē ſit, ſed antedicto æquiangulum.



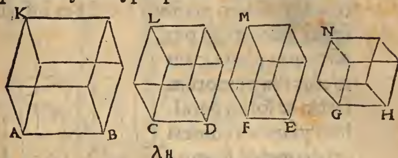
λζ

Ἐὰν τέσσαρες εὐθεῖαι ἀνάλογον ὦσι, καὶ τὰ ἀπ' αὐτῶν παραλληλεπίπεδα ὅμοιά τε καὶ ὁμοίως ἀναγραφόμενα, ἀνάλογον ἔσται· καὶ ἐὰν τὰ ἀπ' αὐτῶν στερεὰ παραλληλεπίπεδα ὅμοιά τε καὶ ὁμοίως ἀναγραφόμενα ἀνάλογον ᾖ, καὶ αὐταὶ αἱ εὐθεῖαι ἀνάλογον ἔσονται.

Theor.32.Propo.37.

Si rectæ quatuor lineæ ſint proportionales, illa quoque ſolida parallelis planis contenta, quæ ab ipſis lineis & ſimilia & ſimiliter deſcribuntur, proportionalia e-

runt. Et si solida parallelis planis comprehensa, quæ & similia & similiter describuntur, sint proportionalia, illę quoque rectę lineę proportionales erunt.

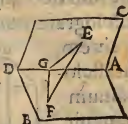


λη

Ἐὰν ἐπίπεδον πρὸς ἐπίπεδον ὀρθὸν ᾖ, καὶ ἀπό τινος σημείου τῶν ἐν ἑνὶ τῶν ἐπιπέδων ἐπὶ τὸ ἕτερον ἐπίπεδον κάθετος ἀχθῇ, ἐπὶ τὴν κοινὴν τομὴν πεσεῖται τῶν ἐπιπέδων ἡ ἀγομένη κάθετος.

Theor.33. Propo.38.

Si planum ad planum rectum sit, & à quodam puncto eorum quæ in vno sunt planorũ perpendicularis ad alterum ducta sit, illa quę ducitur perpendicularis, in communem cadet planorum sectionem.



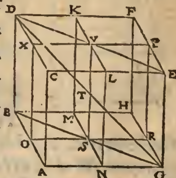
λθ

Ἐὰν στερεοῦ παραλληλεπιπέδου τῶν ἀπεναντίον ἐπιπέδων αἱ πλευραὶ δίχα τμηθῶσι, διὰ δὲ τῶν τομῶν ἐπίπεδα ἐκβληθῇ, ἡ κοινὴ τομὴ τῶν ἐπιπέδων

καὶ ἡ τοῦ στερεοῦ παραλληλεπιπέδου διάμετρος, δίχα τέμνουσιν ἀλλήλας.

Theor. 34. Propo. 39.

Si in solido parallelis planis circũscripto, aduersorum planorũ lateribus bifariã sectis, educta sint per sectiones plana, communis illa planorum sectio & solidi parallelis plani circunscripti diameter, se mutuò bifariam secant.

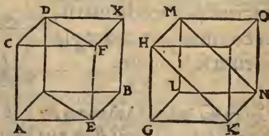


μ

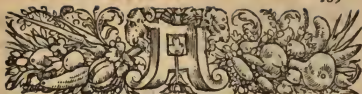
Ἐὰν ᾖ δύο πρίσματα ἰσοϋψῆ, καὶ τὸ μὲν ἔχῃ βάσιν παραλληλόγραμμον, τὸ δὲ τρίγωνον, διπλάσιον δὲ ᾖ τὸ παραλληλόγραμμον τοῦ τριγώνου, ἴσα ἔσται τὰ πρίσματα.

Theor. 35. Propo. 40.

Si duo sint æqualis altitudinis prismata, quorum hoc quidem basim habeat parallelogrammum, illud verò triangulum, sit autem parallelogrãmum trianguli duplum, illa prisinata erunt æqualia.



Elementi vndecimi finis.



ΕΥΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ΙΒ
ΚΑῚ ΣΤΕΡΕΩ͂Ν
ΔΕΎΤΕΡΟΝ.

EVCLIDIS ELEMEN-
TVM DVODECIMVM,
ET SOLIDORVM
SECVNDVM.

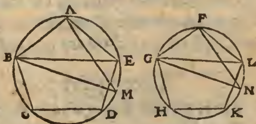
Προτάσεις.

α

Τὰ ἐν τοῖς κύκλοις ὅμοια πολύγωνα πρὸς ἄλλη-
λά ἐστιν, ὡς τὰ ἀπὸ τῶν διαμέτρων τετράγωνα.

Theor.1. Propo.1.

Similia, quæ ſunt in circulis polygωna, rationē habent inter ſe quā deſcripta à diametris quadrata.

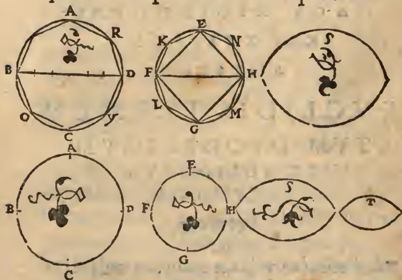


β

οἱ κύκλοι πρὸς ἀλλήλους εἰσὶν, ὡς τὰ ἀπὸ τῶν διαμέτρων τετράγωνα.

Theor.2.Propo.2.

Circuli eam inter ſe rationem habent, quam deſcripta à diametris quadrata.



γ.

Πᾶσα πυραμὶς τρίγωνον ἔχουσα βάσιν, διαιρεῖται εἰς δύο πυραμίδας ἴσας τε καὶ ὁμοίας ἀλλήλαις, τριγώνους βάσεις ἐχούσας, καὶ ὁμοίας τῇ ὅλῃ, καὶ εἰς δύο πρίσματα ἴσα. καὶ τὰ δύο πρίσματα μείζονά ἐστιν, ἢ τὸ ἥμισυ τῆς ὅλης πυραμίδος.

Theor.3.Propo.3.

Omnis pyramis trigonam habens baſim, in duas diuiditur pyramidas non tantùm

æquales & ſimiles inter ſe, ſed toti etiam pyramidi ſimiles, quarum trigωnæ ſunt baſes, atque in duo priſmata æqualia, quæ duo priſmata dimidio pyramidis totius ſunt maiora.

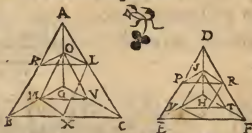
Δ

Ἐὰν ὦσι δύο πυραμίδες ὑπὸ τὸ αὐτὸ ὕψος, τριγώνους ἔχουσαι βάσεις, διαιρεθῇ δὲ ἑκατέρα αὐτῶν εἴς τε δύο πυραμίδας ἴσας ἀλλήλαις καὶ ὁμοίας τῇ ὅλῃ, καὶ εἰς δύο πρίσματα ἴσα, καὶ τῶν γενομένων πυραμίδων ἑκατέρα τὸν αὐτὸν τρόπον, καὶ τοῦτο ἀεὶ γίνηται, ἔστιν ὡς ἡ τῆς μιᾶς πυραμίδος βάσις, πρὸς τὴν τῆς ἑτέρας πυραμίδος βάσιν, οὕτως καὶ τὰ ἐν τῇ μιᾷ πυραμίδι πρίσματα πάντα, πρὸς τὰ ἐν τῇ ἑτέρᾳ πυραμίδι πρίσματα πάντα ἰσοπληθῆ.

Theor. 4. Propo. 4.

Si duæ eiuſdem altitudinis pyramides trigωnas habeant baſes, ſit autem illarum vtraque diuiſa & in duas pyramidas inter ſe æquales totique ſimiles, & in duo priſmata æqualia, ac eodē modo diuidatur vtraque pyramidum quæ ex ſuperiore diuiſione natæ ſunt, idque perpetuò fiat: quemadmodum ſe habet vnius pyrami-

dis basis ad alterius pyramidis basim, ita & omnia quę in vna pyramide prismata, ad omnia quę in altera pyramide, prismata multitudine æqualia.

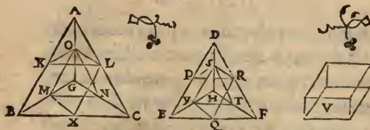


ε

Αἱ ὑπὸ τὸ αὐτὸ ὕψος οὖσαι πυραμίδες, καὶ τρι-
γώνους ἔχουσαι βάσεις, πρὸς ἀλλήλας εἰσὶν ὡς αἱ
βάσεις.

Theor.5. Propo.5.

Pyramides eiusdem altitudinis, quarum trigωnę sunt bases, eam inter se rationem habent quam ipsæ bases.

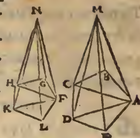


ϛ

Αἱ ὑπὸ τὸ αὐτὸ ὕψος οὖσαι πυραμίδες, καὶ πολυ-
γώνους ἔχουσαι βάσεις, πρὸς ἀλλήλας εἰσὶν ὡς αἱ
βάσεις.

Theor.6.Propo.6.

Pyramides eiuſdem altitudinis, quarum polygωnæ ſunt baſes, eam inter ſe rationem habẽt quam ipſæ baſes.

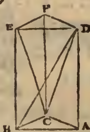


ζ

Πᾶν πρίσμα τρίγωνον ἔχον βάσιν, διαιρεῖται εἰς τρεῖς πυραμίδας ἴσας ἀλλήλαις, τριγώνους βάσεις ἐχούσας.

Theor. 7.Propo. 7.

Omne priſma trigωnã habens baſim, diuiditur in tres pyramidas inter ſe æquales, quarum trigωnæ ſunt baſes.

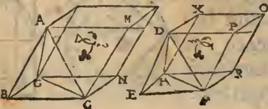


η

Αἱ ὅμοιαι πυραμίδες, καὶ τριγώνους ἔχουσαι βάσεις, ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ὁμολόγων πλευρῶν.

Theor. 8. Propo. 8.

Similes pyramides quæ trigωnas habent baſes, in triplicata ſunt homologorũ laterum ratione.

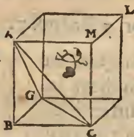


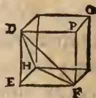
ϑ

Τῶν ἴσων πυραμίδων, καὶ τριγώνους βάσεις ἐχουσῶν ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσι. καὶ ὧν πυραμίδων τριγώνους βάσεις ἐχουσῶν ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσιν, ἴσαι εἰσὶν ἐκεῖναι.

Theor.9.Propo.9.

Æqualium pyramidum & trigωnas bases habentium reciprocantur bases cum altitudinibus. Et quarum pyramidum trigωnas bases habentium reciprocantur bases cum altitudinibus, illæ sunt æquales.





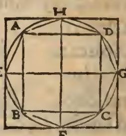
ι

Πᾶς κῶνος, κυλίνδρου τρίτον μέρος ἐστὶ τοῦ τὴν αὐτὴν βάσιν ἔχοντος αὐτῷ καὶ ὕψος ἴσον.

Theor.10.Propo.10.

Omnis cωnus tertia pars est Cylindri eandẽ cũ ipso cωno basim habentis, & altitudinẽ æqualem.



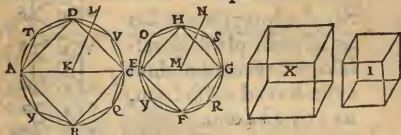


ια

Οἱ ὑπὸ τὸ αὐτὸ ὕψος ὄντες κῶνοι καὶ κύλινδροι, πρὸς ἀλλήλους εἰσὶν ὡς αἱ βάσεις.

Theor.11.Propo.11.

Cωni & cylindri eiuſdé altitudinis, eam inter ſe rationem habent quam baſes.

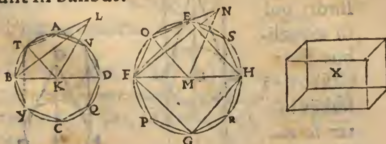


ιβ

Οἱ ὅμοιοι κῶνοι καὶ κύλινδροι, ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ἐν ταῖς βάσεσι διαμέτρων.

Theor.12. Propo.12.

Similes cωni & cylindri, triplicatam habent inter ſe rationem diametrorum quę ſunt in baſibus.

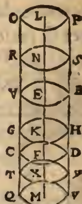


ιγ

Ἐὰν κύλινδρος ἐπιπέδῳ τμηθῇ παραλλήλῳ ὄντι τοῖς ἀπεναντίον ἐπιπέδοις, ἔσται ὡς ὁ κύλιν-

δρος πρὸς τὸν κύλινδρον, οὕτως ὁ ἄξων πρὸς τὸν ἄξονα.

Theor. 13. Proposit. 13.



Si cylindrus plano sectus sit aduersis planis parallelo, erit quemadmodum cylindrus ad cylindrum, ita axis ad axem.

ιδ

οἱ ἐπὶ ἴσων βάσεων ὄντες κῶνοι καὶ κύλινδροι, πρὸς ἀλλήλους εἰσὶν ὡς τὰ ὕψη.

Theore. 14. Propo. 14.

Coni & cylindri qui in æqualibus sunt basibus, eã habẽt inter se rationem, quam altitudines.



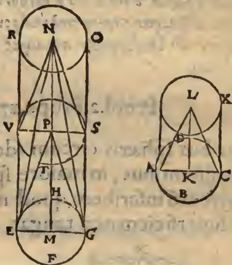


ιε

Τῶν ἴσων κώνων καὶ κυλίνδρων ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσι. καὶ ὧν κώνων καὶ κυλίνδρων ἀντιπεπόνθασιν αἱ βάσεις τοῖς ὕψεσιν, ἴσοι εἰσὶν ἐκεῖνοι.

Theor.15. Propo.15.

Æqualium conorum & cylindrorum bases cũ altitudinibus reciprocãtur. Et quorum conorum & cylindrorũ bases cum altitudinibus reciprocãtur, illi sunt æquales.



ις

Δύο κύκλων περὶ τὸ αὐτὸ κέντρον ὄντων, εἰς τὸν μείζονα κύκλον, πολύγωνον ἰσόπλευρόν τε καὶ ἀρτιόπλευρον ἐγγράψαι, μὴ ψαῦον τοῦ ἐλάσσονος κύκλου.

Probl.1. Propo.16.

Duobus circulis circum idem centrum

consistentibus, in maiore circulo polygωnũ æqualium pariumque laterum inscribere, quod minorem circulum nõ tangat.

ιζ

Δύο σφαιρῶν περὶ τὸ αὐτὸ κέντρον οὐσῶν, εἰς τὴν μείζονα σφαῖραν στερεὸν πολύεδρον ἐγγράψαι, μὴ ψαῦον τῆς ἐλάσσονος σφαίρας κατὰ τὴν ἐπιφάνειαν.

Probl.2.Propo.17.

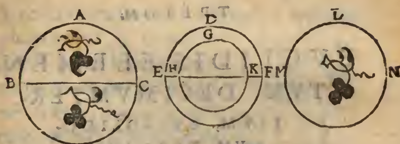
Duabus sphæris circum idem centrum consistentibus, in maiore sphæra solidũ polyedrũ inscribere, quod minoris sphæræ superficiem non tangat.

ιη

Αἱ σφαῖραι πρὸς ἀλλήλας ἐν τριπλασίονι λόγῳ εἰσὶ τῶν ἰδίων διαμέτρων.

Theor.16.Propo.18.

Sphæræ inter ſe rationem habẽt ſuarum diametrorum triplicatam.



Elementi duodecimi finis.



ΕΥΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙΟΝ ΙΓ ΚΑΙ ΣΤΕΡΕΩΝ ΤΡΙΤΟΝ.

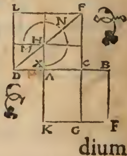
EVCLIDIS ELEMENTVM DECIMVMTERTIVM, ET SOLIDORVM TERTIVM.

Προτάσεις.

α

Ἐὰν εὐθεῖα γραμμὴ ἄκρον καὶ μέσον λόγον τμηθῇ, τὸ μεῖζον τμῆμα προσλαβὸν τὴν ἡμίσειαν τῆς ὅλης, πενταπλάσιον δύναται τοῦ ἀπὸ τῆς ἡμισείας τῆς ὅλης.

Theor.1.Propo.1.



Si recta linea per extremam & mediam rationẽ secta sit, maius segmentũ quod totius lineæ dimidium

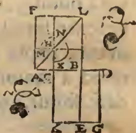
dium aſſumpſerit, quintuplum poteſt eius quadrati, quod à totius dimidia deſcribitur.

β

Ἐὰν εὐθεῖα γραμμὴ, τμήματος ἑαυτῆς πενταπλάσιον δύνηται, τῆς διπλασίας τοῦ εἰρημένου τμήματος ἄκρον καὶ μέσον λόγον τεμνομένης, τὸ μεῖζον τμῆμα τὸ λοιπὸν μέρος ἐστὶ τῆς ἐξ ἀρχῆς εὐθείας.

Theor.2.Prop.2.

Si recta linea ſui ipſius ſegmenti quintuplum poſsit, & dupla ſegmēti huius linea per extremam & mediā rationē ſecetur, maius ſegmētum reliqua pars eſt lineę primùm poſitæ.

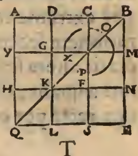


γ

Ἐὰν εὐθεῖα γραμμὴ ἄκρον καὶ μέσον λόγον τμηθῇ, τὸ ἔλασσον τμῆμα προσλαβὸν τὴν ἡμίσειαν τοῦ μείζονος τμήματος, πενταπλάσιον δύναται τοῦ ἀπὸ τῆς ἡμισείας τοῦ μείζονος τετραγώνου.

Theor.3.Prop.3.

Si recta linea per extremā & mediam rationem ſecta ſit, minus ſegmentū quod maioris ſegmenti dimidium aſſumpſerit,



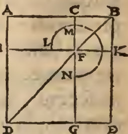
quintuplum poteſt eius, quod à maioris ſegmenti dimidio deſcribitur, quadrati.

δ

Ἐὰν εὐθεῖα γραμμὴ ἄκρον καὶ μέσον λόγον τμηθῇ, τὸ ἀπὸ τῆς ὅλης καὶ τοῦ ἐλάττονος τμήματος, τὰ συναμφότερα τετράγωνα, τριπλάσιά ἐστι τοῦ ἀπὸ τοῦ μείζονος τμήματος τετραγώνου.

Theor.4.Propo.4.

Si recta linea per extremam & mediam rationem ſecta ſit, quod à tota, quodq; à minore ſegmento ſimul vtraq; quadrata, tripla ſunt eius, quod à maiore ſegmẽto deſcribitur, quadrati.

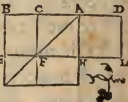


ε

Ἐὰν εὐθεῖα γραμμὴ ἄκρον καὶ μέσον λόγον τμηθῇ, καὶ προστεθῇ ἴση τῷ μείζονι τμήματι, ὅλη ἡ εὐθεῖα ἄκρον καὶ μέσον λόγον τέτμηται, καὶ τὸ μεῖζον τμῆμά ἐστιν, ἡ ἐξ ἀρχῆς εὐθεῖα.

Theor.5.Propoſi.5.

Si ad rectam lineam, quæ per extremam & mediã rationem ſecetur, adiuncta ſit altera ſegmẽto maiori æqualis, tota hæc linea recta per extremam



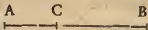
& mediam rationem secta est, estque maius segmentum linea primùm posita.

ϛ

Ἐὰν εὐθεῖα ῥητὴ ἄκρον καὶ μέσον λόγον τμηθῇ, ἑκάτερον τῶν τμημάτων ἄλογός ἐστιν, ἡ καλουμένη ἀποτομή.

Theor. 6. Propo. 6.

Si recta linea ῥητὴ siue rationalis, per extremam & mediam rationem secta sit, vtrunque segmentorum ἄλογος siue irrationalis est linea, quæ dicitur Residuum.

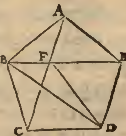


ζ

Ἐὰν πενταγώνου ἰσοπλεύρου αἱ τρεῖς γωνίαι, ἤτοι αἱ κατὰ τὸ ἑξῆς, ἢ αἱ μὴ κατὰ τὸ ἑξῆς, ἴσαι ὦσιν, ἰσογώνιον ἔσται τὸ πεντάγωνον.

Theor. 7. Propositio. 7.

Si pentagωni æquilateri tres sint æquales anguli, siue qui deinceps, siue qui non deinceps sequũtur, illud pentagωnum erit æquiangulum.



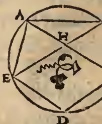
η

Ἐὰν πενταγώνου ἰσοπλεύρου καὶ ἰσογωνίου τὰς κατὰ τὸ ἑξῆς δύο γωνίας ὑποτείνωσιν εὐθεῖαι, ἄκρον

καὶ μέσον λόγον τέμνουσιν ἀλλήλας, καὶ τὰ μείζ
αὐτῶν τμήματα ἴσα ἐστὶ τῇ τοῦ πενταγώνου πλευ

Theor.8.Propo.8.

Si pentagωni æquilateri & æquiang
duos qui deinceps ſequũtur angulos
ctæ ſubtendant lineæ, illæ per extrem
& mediam rationem ſe mutuo ſecant, earumque maiora ſegmenta, ipſius pentagωni lateri ſunt æqualia.

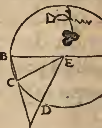


θ

Ἐὰν ἡ τοῦ ἑξαγώνου πλευρὰ καὶ ἡ τοῦ δεκαγώνου,
αὐτὸν κύκλον ἐγγραφομένων, συντεθῶσιν, ἡ
εὐθεῖα ἄκρον καὶ μέσον λόγον τέτμηται, καὶ τὸ
ζον αὐτῆς τμῆμά ἐστιν ἡ τοῦ ἑξαγώνου πλευρά.

Theor.9.Propo.9.

Si latus hexagωni & latus decagωni c
circulo inſcriptorum cõpoſita ſint, tota recta linea per extremã & mediam rationem ſecta eſt, eiuſque ſegmentum maius, eſt hexagωni latus.



ι

Ἐὰν εἰς κύκλον πεντάγωνον ἰσόπλευρον ἐγ

φῇ, ἡ τ̃ πενταγώνȣ πλευρὰ δύναται τήν τε τȣ̃ ἑξαγώνȣ καὶ τὴν τ̃ δεκαγώνȣ, τῶν εἰς τὸν αὐτὸν κύκλον ἐγγραφομένων.

Theor.10.Propo.10.

Si circulo pentagωnum æquilaterũ inſcriptum ſit, pentagωni latus poteſt & latus hexagωni & latus decagωni, eidem circulo inſcriptorum.

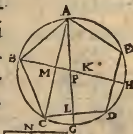


ια

Ἐὰν εἰς κύκλον ῥητὴν ἔχοντα τὴν διάμετρον, πεντάγωνον ἰσόπλευρον ἐγγραφῇ, ἡ τȣ̃ πενταγώνȣ πλευρὰ ἄλογός ἐστιν, ἡ καλουμένη ἐλάσσων.

Theor.11.Propo.11.

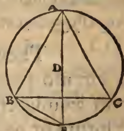
Si in circulo ῥητὴν habente diametrum, inſcriptũ ſit pentagωnum æquilaterum, pentagωni latus irrationalis eſt linea, quæ vocatur Minor.



ιβ

Ἐὰν εἰς κύκλον τρίγωνον ἰσόπλευρον ἐγγραφῇ, ἡ τȣ̃ τριγώνȣ πλευρὰ, δυνάμει τριπλασίων ἐστὶ τῆς ἐκ τȣ̃ κέντρου τȣ̃ κύκλȣ.

Theor.12. Propositio 12.



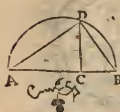
Si in circulo inſcriptum ſit triangulum æquilaterum, huius trianguli latus potentia triplum eſt eius lineæ, quæ ex circuli centro ducitur.

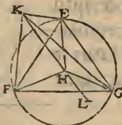
ιγ

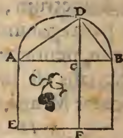
Πυραμίδα συστήσασθαι, καὶ σφαίρᾳ περιλαβεῖν τῇ δοθείσῃ, καὶ δεῖξαι ὅτι ἡ τῆς σφαίρας διάμετρος, δυνάμει ἡμιολία ἐστὶ τῆς πλευρᾶς τῆς πυραμίδος.

Probl.1.Propo.13.

Pyramidem conſtituere, & data ſphæra cõplecti, atque docere illius ſphæræ diametrum potentia ſeſquialteram eſſe lateris ipſius pyramidis.







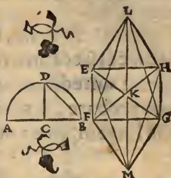
ιδ

Ὀκτάεδρον συστήσασθαι, καὶ σφαίρᾳ περιλαβεῖν ᾗ καὶ τὴν πυραμίδα, καὶ δεῖξαι ὅτι ἡ τῆς σφαίρας

διάμετρος δυνάμει διπλασία ἐστὶ τῆς πλευρᾶς τοῦ ὀκταέδρου.

Probl.2.Propo.14.

Octaëdrum constituere, eaque sphæra qua pyramidem cõplecti, atque probare illius sphæræ diametrum potentia duplam esse lateris ipsius octaëdri.

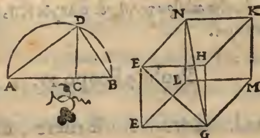


ιε

κύβον συστήσασθαι, καὶ σφαίρᾳ περιλαβεῖν ᾗ καὶ τὰ πρότερα, καὶ δεῖξαι ὅτι ἡ τῆς σφαίρας διάμετρος δυνάμει τριπλῆ ἐστὶ τῆς τοῦ κύβου πλευρᾶς.

Probl.3.Propo.15.

Cubum constituere, eaque sphęra qua & superiores figuras cõplecti, atque docere illius sphęrę diametrum potentia triplã esse lateris ipsius cubi.

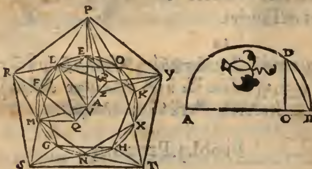


ιϛ

Εἰκοσάεδρον συστήσασθαι καὶ σφαίρᾳ περιλαβεῖν, ᾗ καὶ τὰ προειρημένα σχήματα, καὶ δεῖξαι ὅτι ἡ τοῦ εἰκοσαέδρου πλευρὰ ἄλογός ἐστι, ἡ καλουμένη ἐλάττων.

Probl.4. Propo.16.

Icoſaêdrũ cõſtituere, eademque ſphæra qua & antedictas figuras complecti, atque probare, Icoſaëdri latus irrationalẽ eſſe lineam, quæ vocatur Minor.

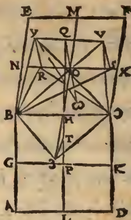


ιζ

Δωδεκάεδρον συστήσασθαι καὶ σφαίρᾳ περιλαβεῖν, ᾗ καὶ τὰ προειρημένα σχήματα, καὶ δεῖξαι ὅτι ἡ τοῦ δωδεκαέδρου πλευρὰ ἄλογός ἐστιν, ἡ καλουμένη ἀποτομή.

Probl.5. Propo.17.

Dodecaëdrum conſtituere, eadémque ſphæra qua & antedictas figuras com-

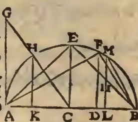


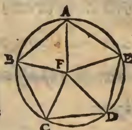
plecti, atque probare dω decaëdri latus irrationalem esse lineam, quæ vocatur Residuum.

Τὰς πλευρὰς τῶν πέντε σχημάτων ἐκθέσθαι, καὶ συγκρῖναι πρὸς ἀλλήλας.

Probl.6.Propo.18.

Quinque figurarum latera proponere, & inter se cōparare.





ΣΧΟΛΙΟΝ.

Λέγω δὴ ὅτι παρὰ τὰ εἰρημένα ε̄ σχήματα οὐ συσταθήσεται ἕτερον σχῆμα, περιεχόμενον ὑπὸ ἰσοπλεύρων τε καὶ ἰσογωνίων, ἴσων ἀλλήλοις. ὑπὸ μὲν γὰρ δύο τριγώνων, ἀλλ' οὐδὲ ἄλλων δύο ἐπιπέδων στερεὰ γωνία οὐ συσταθήσεται.

ὑπὸ δὲ τριῶν τριγώνων, ἡ τῆς πυραμίδος.

ὑπὸ δὲ τεσσάρων, ἡ τοῦ ὀκταέδρου.

ὑπὸ δὲ ε, ἡ τοῦ εἰκοσαέδρου.

ὑπὸ δὲ ἓξ τριγώνων ἰσοπλεύρων τε καὶ ἰσογωνίων πρὸς ἑνὶ σημείῳ συνισταμένων, οὐκ ἔσται στερεὰ γωνία. οὔσης γὰρ τῆς τοῦ ἰσοπλεύρου τριγώνου γωνίας διμοίρου ὀρθῆς, ἔσονται αἱ ἓξ τέσσαρσιν ὀρθαῖς ἴσαι, ὅπερ ἀδύνατον. ἅπασα γὰρ στερεὰ γωνία, ὑπὸ ἐλασσόνων ἢ τεσσάρων ὀρθῶν περιέχεται. διὰ τὰ αὐτὰ δὴ οὐδὲ ὑπὸ πλειόνων ἢ ἓξ γωνιῶν ἐπιπέδων στερεὰ γωνία συνίσταται.

ὑπὸ δὲ τετραγώνων τριῶν, ἡ τοῦ κύβου γωνία περιέχεται.

ὑπὸ δὲ τεσσάρων, ἀδύνατον. ἔσονται γὰρ πάλιν τέσσαρες ὀρθαί.

ὑπὸ δὲ πενταγώνων ἰσοπλεύρων καὶ ἰσογωνίων, ὑπὸ μὲν τριῶν, ἡ τοῦ δωδεκαέδρου.

ὑπὸ δὲ τεσσάρων, ἀδύνατον. οὔσης γὰρ τῆς τοῦ ἰσοπλεύρου πενταγώνου γωνίας ὀρθῆς καὶ πέμπτου, ἔσονται αἱ τέσσαρες γωνίαι τεσσάρων ὀρθῶν μείζους,

ὅπερ ἀδύνατον. οὐδὲ μὴν ὑπὸ πολυγώνων ἑτέρων σχημάτων περιεχεθήσεται στερεὰ γωνία, διὰ τὸ ἄτοπον. οὐκ ἄρα παρὰ τὰ εἰρημένα ε̄ σχήματα ἕτερον σχῆμα στερεὸν συσταθήσεται, ὑπὸ ἰσοπλεύρων τε καὶ ἰσογωνίων περιεχόμενον. ὅπερ ἔδει δεῖξαι.

SCHOLIVM.

Aio vero, præter dictas quinque figuras non posse aliam constitui figuram solidam, quæ planis & æquilateris & æquiangulis contineatur, inter se æqualibus. Non enim ex duobus triangulis, sed neque ex aliis duabus figuris solidus constituetur angulus.

Sed ex tribus triangulis, constat Pyramidis angulus.

Ex quatuor autem, Octaëdri.

Ex quinque vero, Icosaëdri.

Nam ex triangulis sex & æquilateris & æquiangulis ad idem punctum coeuntibus, non fiet angulus solidus. Cùm enim trianguli æquilateri angulus, recti vnius bessem contineat, erunt eiusmodi sex anguli rectis quatuor æquales. Quod fieri nō potest. Nam solidus omnis angulus, minoribus quàm rectis quatuor angulis continetur, per 21. 11.

Ob easdem sanè causas, neque ex pluribus quàm planis sex eiusmodi angulis solidus constat.

Sed ex tribus quadratis, Cubi angulus continetur.

Ex quinque, nullus potest. Rursus enim recti quatuor erunt.

Ex tribus autem pentagωnis æquilateris & æquiangulis, Dωdecaedri angulus cōtinetur. Sed ex quatuor, nullus potest. Cùm enim pentagωni æquilateri angulus rectus sit & quinta recti pars, erunt quatuor anguli rectis quatuor maiores. Quod fieri nequit. Nec sanè ex aliis polygωnis figuris solidus angulus continebitur, quòd hinc quoque absurdum sequatur. Quamobrem perspicuum est, præter dictas quinque figuras aliam figuram solidam nō posse constitui, quæ ex planis æquilateris & æquiangulis contineatur.

Elementi decimitertij finis.



ΕΥ̓ΚΛΕΙΔΟΥ ΣΤΟΙΧΕΙ͂ΟΝ ΙΔ ΚΑῚ ΣΤΕΡΕΩ͂Ν ΤΈΤΑΡΤΟΝ,

ὡς οἴονταί τινες, ὡς ἄλλοι δὲ, ΥΨΙΚΛΈΟΥΣ *Ἀλεξανδρέως, περὶ τῶν ε σωμάτων, πρῶτον.*

Βασιλείδης ὁ Τύριος, ὦ Πρώταρχε, παραγενηθεὶς εἰς Ἀλεξάνδρειαν, καὶ συσταθεὶς τῷ πατρὶ ἡμῶν διὰ τὴν ἀπὸ τοῦ μαθήματος συγγένειαν, συνδιέτριψεν αὐτῷ τὸν πλεῖστον τῆς ἐπιδημίας χρόνον. καί ποτε διελοῦντες τὸ ὑπὸ Ἀπολλωνίου γραφὲν περὶ τῆς συγκρίσεως τοῦ δωδεκαέδρου καὶ τοῦ εἰκοσαέδρου, τῶν εἰς τὴν αὐτὴν σφαῖραν ἐγγραφομένων, τίνα λόγον ἔχει ταῦτα πρὸς ἄλληλα, ἔδοξαν ταῦτα μὴ ὀρθῶς γεγραφέναι τὸν Ἀπολλώνιον. αὐτοὶ δὲ ταῦτα διακαθάραντες, ἔγραψαν, ὡς ἦν ἀκούειν τοῦ πατρός. ἐγὼ δὲ ὕστερον

περιέπεσον ἑτέρῳ βιβλίῳ ὑπὸ Ἀπολλωνίου ἐκδε-
δομένῳ, καὶ περιέχοντι ἀπόδειξιν ὑγιῶς περὶ τοῦ
ὑποκειμένου, καὶ μεγάλως ἐψυχαγωγήθην ἐπὶ τῇ
προβλήματος ζητήσει. τὸ μὲν ὑπὸ Ἀπολλωνίου ἐκ-
δοθὲν ἔοικε κοινῇ σκοπεῖν. καὶ γὰρ περιφέρεται.
τὸ δ' ὑφ' ἡμῶν δοκοῦν ὕστερον γεγραφέναι φιλο-
πόνως, ὅσα δοκεῖν, ὑπομνηματισάμενος ἔκρινα
προσφωνῆσαι σοι διὰ τὴν ἐν ἅπασι μαθήμασι,
μάλιστα δ' ἐν γεωμετρίᾳ προκοπὴν ἐμπείρως κρί-
νοντι τὰ ῥηθησόμενα, διὰ δὲ τὴν πρὸς τὸν πατέρα
συνήθειαν, καὶ τὴν πρὸς ἡμᾶς εὔνοιαν, εὐμενῶς ἀκουσο-
μένῳ τῆς πραγματείας. καιρὸς δ' ἂν εἴη προοι-
μίου μὲν πεπαῦσθαι, τῆς δὲ συντάξεως ἄρχεσθαι.



EVCLIDIS ELEMENTVM DECIMVM QVARTVM, VT QVIDAM ARBItrantur, vt alij verò, Hypsiclis Alexandrini, de quinque corporibus,

LIBER PRIMVS.

BAsilides Tyrius, Protarche, Alexandriam profectus, patrique nostro ob disciplinæ societatem commendatus, longißimo peregrinationis tempore cum eo versatus est. Cúmque disserent aliquando de scripta ab Apollonio cõparatione Dodecaedri & Icosaedri eidem sphæræ inscriptorum, quam hæc inter se habeant rationem, censuerunt ea non rectè tradidisse Apollonium: quæ à se emendata, vt de patre audire erat, literis prodiderunt. Ego autem postea incidi in alterum librum ab Apollonio editum, qui de-

monstrationem accuratè complecteretur de re proposita, ex eiusque problematis indagatione magnam equidem cepi voluptatem. Illud certè ab omnibus perspici potest, quod scripsit Apollonius, cùm sit in omnium manibus. Quod autem diligenti, quantum coniicere licet, studio nos postea scripsisse videmur, id monimentis consignatum tibi nuncupandum duximus, vt qui feliciter cùm in omnibus disciplinis tum vel maximè in Geometria versatus, scitè ac prudenter iudices ea quæ dicturi sumus: ob eam verò, quæ tibi cum patre fuit, vitæ consuetudinem, quáque nos complecteris, beneuolentiam, tractationẽ ipsam libenter audias. Sed iam tempus est, vt proœmio modum facientes, hanc syntaxim aggrediamur.

προτάσεις.

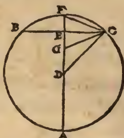
α

Ἡ ἀπὸ τοῦ κέντρου κύκλου τινός, ἐπὶ τὴν τοῦ πενταγώνου πλευρὰν, τοῦ εἰς τὸν αὐτὸν κύκλον ἐγγραφομένου κάθετος ἀγομένη, ἡμίσειά ἐστι συναμφοτέρου, τῆς τε ἐκ τοῦ κέντρου καὶ τῆς τοῦ δεκαγώνου, τῶν εἰς τὸν κύκλον ἐγγραφομένων.

Theor.1. Propo.1.

Perpendicularis linea, quæ ex circuli cuiuspiam

iuſpiam cētro in latus pentagωni ipſi circulo inſcripti ducitur, dimidia eſt vtriuſque ſimul lineæ, & eius quæ ex centro, & lateris decagωni in eodē circulo inſcripti.

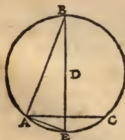


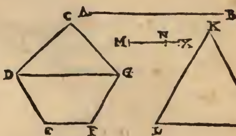
β

Ὁ αὐτὸς κύκλος περιλαμβάνει τό τε τοῦ δωδεκαέδρου πεντάγωνον, καὶ τὸ τοῦ εἰκοσαέδρου τρίγωνον τῶν εἰς τὴν αὐτὴν σφαῖραν ἐγγραφομένων.

Theor.2.Propo.2.

Idem circulus comprehendit & dωdecaëdri pentagωnum & icoſaëdri triangulum, eidem ſphæræ inſcriptorum.



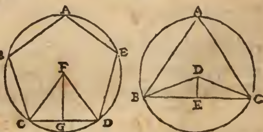


γ

Ἐὰν ᾖ πεντάγωνον ἰσόπλευρόν τε καὶ ἰσογώνιον, καὶ περὶ τοῦτο κύκλος, καὶ ἀπὸ τοῦ κέντρου κάθετος ἐπὶ μίαν πλευρὰν ἀχθῇ, τὸ τριακοντάκις ὑπὸ μιᾶς τῶν πλευρῶν καὶ τῆς καθέτου, ἴσον ἐστὶ τῇ τοῦ δωδεκαέδρου ἐπιφανείᾳ.

Theor.3.Propo.3.

Si pentagωno & æquilatero & æquiangulo circunſcriptus ſit circulus, ex cuius cẽtro in vnũ pentagωni latus ducta ſit perpendicularis: quod vno laterum & perpendiculari trigeſies continetur, illud æquale eſt dωdecaëdri ſuperficiei.



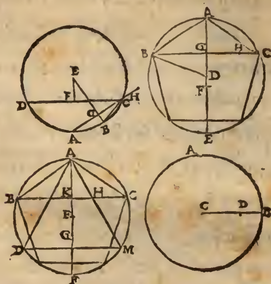
δ

τούτου δήλου ὄντος, δεικτέον ὅτι ἔσται ὡς ἡ τοῦ δωδεκαέδρου ἐπιφάνεια πρὸς τὴν τοῦ εἰκοσαέδρου, οὕτως ἡ τοῦ κύβου πλευρὰ πρὸς τὴν τοῦ εἰκοσαέδρου πλευράν.

Theor.4.Propo.4.

Hoc perſpicuum cùm ſit, probandum eſt, quemadmodũ ſe habet dωdecaëdri

ſuperficies ad icoſaëdri ſuperficiem, ita ſe habere cubi latus ad icoſaëdri latus.



Cubi latus.

E

Dodecaëdri.

F

Icoſaëdri.

G

ΣΧΟΛΙΟΝ.

Δεικτέον δὴ νῦν, ὅτι ὡς ἡ τοῦ κύβου πλευρὰ πρὸς τὴν τοῦ εἰκοσαέδρου, οὕτω τὸ στερεὸν τοῦ δωδεκαέδρου πρὸς τὸ στερεὸν τοῦ εἰκοσαέδρου. ἐπεὶ γὰρ ἴσοι κύκλοι περιλαμβάνουσι τό, τε τοῦ δωδεκαέδρου πεντάγωνον καὶ τὸ τοῦ εἰκοσαέδρου τρίγωνον, τῶν εἰς τὴν αὐτὴν σφαῖραν ἐγγραφομένων, ἐν δὲ ταῖς σφαίραις οἱ ἴσοι κύκλοι ἴσον ἀπέχουσιν ἀπὸ τοῦ κέντρου. αἱ γὰρ ἀπὸ τοῦ κέντρου τῆς σφαίρας ἐπὶ τὰ τῶν κύκλων ἐπίπεδα κάθετοι ἀγόμεναι, ἴσαι τε εἰσὶν καὶ ἐπὶ τὰ κέντρα τῶν κύκλων πίπτουσιν. ὥστε αἱ ἀπὸ τοῦ κέντρου τῆς σφαίρας ἐπὶ τὸ κέντρον τοῦ κύκλου τοῦ περιλαμβάνοντος τό τε τοῦ εἰκοσαέδρου τρίγωνον καὶ τοῦ δωδεκαέδρου πεντάγωνον, ἴσαι εἰσί, τουτέστιν αἱ κάθετοι. ἰσοϋψεῖς ἄρα εἰσὶν αἱ πυραμίδες αἱ βάσεις ἔχουσαι τὰ τοῦ δωδεκαέδρου πεντάγωνα, καὶ αἱ βάσεις ἔχουσαι τὰ τοῦ εἰκοσαέδρου τρίγωνα. αἱ δὲ ἰσοϋψεῖς πυραμίδες πρὸς ἀλλήλας εἰσὶν ὡς αἱ βάσεις. ὡς ἄρα τὸ πεντάγωνον πρὸς τὸ τρίγωνον,

οὕτως ἡ πύραμις ἧς βάσις μέν ἐστι τὸ τοῦ δωδεκαέδρου πεντάγωνον, κορυφὴ δὲ τὸ κέντρον τῆς σφαίρας, πρὸς τὴν πυραμίδα ἧς βάσις μέν ἐστι τὸ τοῦ εἰκοσαέδρου τρίγωνον, κορυφὴ δὲ τὸ κέντρον τῆς σφαίρας. Καὶ ὡς ἄρα δώδεκα πεντάγωνα πρὸς εἴκοσι τρίγωνα, οὕτω δώδεκα πυραμίδες πενταγώνων βάσεις ἔχουσαι πρὸς εἴκοσι πυραμίδας τριγώνους βάσεις ἐχούσας. καὶ δώδεκα πεντάγωνα ἡ τοῦ δωδεκαέδρου ἐπιφάνειά ἐστιν, εἴκοσι δὲ τρίγωνα ἡ τοῦ εἰκοσαέδρου ἐπιφάνειά ἐστιν. ἔστι ἄρα ὡς ἡ τοῦ δωδεκαέδρου ἐπιφάνεια πρὸς τὴν τοῦ εἰκοσαέδρου ἐπιφάνειαν, οὕτω δώδεκα πυραμίδες πενταγώνους βάσεις ἔχουσαι πρὸς εἴκοσι πυραμίδας τριγώνους βάσεις ἐχούσας. Καὶ εἰσὶ δώδεκα μὲν πυραμίδες πενταγώνους βάσεις ἔχουσαι, τὸ στερεὸν τοῦ δωδεκαέδρου, εἴκοσι δὲ πυραμίδες τριγώνους βάσεις ἔχουσαι, τὸ στερεὸν τοῦ εἰκοσαέδρου. καὶ ὡς ἄρα ἡ τοῦ δωδεκαέδρου ἐπιφάνεια πρὸς τὴν τοῦ εἰκοσαέδρου, οὕτω τὸ στερεὸν τοῦ δωδεκαέδρου πρὸς τὸ στερεὸν τοῦ εἰκοσαέδρου. ὡς δὲ ἡ ἐπιφάνεια τοῦ δωδεκαέδρου πρὸς τὴν ἐπιφα-

νειαν τοῦ εἰκοσαέδρου, οὕτως ἐστὶν ἡ τοῦ κύβου πλευρὰ πρὸς τὴν τοῦ εἰκοσαέδρου πλευράν. καὶ ὡς ἄρα ἡ τοῦ κύβου πλευρὰ πρὸς τὴν τοῦ εἰκοσαέδρου πλευράν, οὕτω τὸ στερεὸν τοῦ δωδεκαέδρου πρὸς τὸ στερεὸν τοῦ εἰκοσαέδρου.

SCHOLIVM.

Nunc autem probandum est, quemadmodum se habet cubi latus ad Icosaëdri latus, ita se habere solidum dωdecaëdri ad Icosaëdri solidum. Cũ enim æquales circuli comprehendant & dωdecaëdri pentagωnum & Icosaëdri triangulum, eidem sphæræ inscriptorum: in sphæris autem æquales circuli æquali interuallo distent à centro (siquidẽ perpẽdiculares à sphæræ cẽtro ad circulorum plana ductæ & æquales sunt, & ad circulorum centra cadunt) idcirco lineæ, hoc est perpendiculares quæ à sphæræ centro ducuntur ad centrum circuli comprehendentis & triangulum Icosaëdri & pẽtagωnum dωdecaëdri, sunt æquales. Sunt igitur æqualis altitudinis Pyramides, quæ bases habent ipsa dωdecaëdri pentagωna, & quæ, Icosaëdri triangula. At æqualis altitudinis pyramides rationem inter se habent eam quam bases, ex 5. & 6.11. Quemadmodum igitur pentagωnum ad triangulum, ita pyramis,

cuius basis quidem est dωdecaëdri pẽtagωnum, vertex autem, sphæræ centrum, ad pyramida cuius basis quidem est Icosaëdri triangulum, vertex autem, sphæræ centrum. Quamobrem ut se habent duodecim pentagωna ad viginti triãgula, ita duodecim pyramides quorum pentagωnæ sint bases, ad viginti pyramidas, quæ trigωnas habeant bases. At pẽtagωna duodecim sunt dωdecaëdri superficies, viginti autem triangula, Icosaëdri. Est igitur ut dωdecaëdri superficies ad Icosaëdri superficiem, ita duodecim pyramides, quæ pentagωnas habeant bases, ad viginti pyramidas, quarum trigωnæ sunt bases. Sunt autem duodecim quidem pyramides, quæ pentagωnas habeant bases, solidum dωdecaëdri: viginti autem pyramides, quæ trigωnas habeant bases, Icosaëdri solidum. Quare ex 11.5. *ut dωdecaëdri superficies ad Icosaëdri superficiem, ita solidum dωdecaëdri ad Icosaëdri solidum. Ut autem dωdecaëdri superficies ad Icosaëdri superficiẽ, ita probatum est cubi latus ad Icosaëdri latus. Quẽadmodum igitur cubi latus ad Icosaëdri latus, ita se habet solidum dωdecaëdri ad Icosaëdri solidum.*

Elementi decimiquarti finis.



ΕΥ̓ΚΛΕΙ-
ΔΟΥ ΣΤΟΙΧΕΙ̃ΟΝ ΙΕ ΚΑῚ ΣΤΕΡΕΩ͂Ν ΠΈΜΠΤΟΝ,

ὡς οἴονταί τινες, ὡς ἄλλοι δὲ ὙΨΙ-
ΚΛΈΟΥΣ Ἀλεξανδρέως,
περὶ τῶν ε σωμά-
των, δεύτερον.

EVCLIDIS ELEMEN-
TVM DECIMVMQ.VINTVM, ET SOLIDORVM QVIN-

tum, vt nonnulli putant:
vt autem alii, Hypsi-
clis Alexandrini
de quinq; cor
poribus,

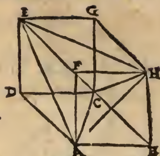
LIBER SECVNDVS.

Προτάσεις.

α

Εἰς τὸν δοθέντα κύβον πυραμίδα ἐγγράψαι.

Problema 1. Propositio 1.

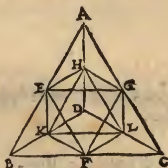


In dato cubo pyramida inscribere.

β

Εἰς τὴν δοθεῖσαν πυραμίδα ὀκτάεδρον ἐγγράψαι.

Problema 2. Prosi. 2.

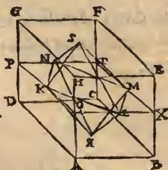


In data pyramide octaëdrum inscribere.

γ

Εἰς τὸν δοθέντα κύβον ὀκτάεδρον ἐγγράψαι.

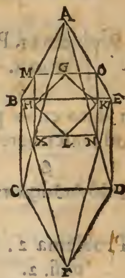
Probl. 3. Prosi. 3.



In dato cubo octaëdrum inscribere.

δ

Εἰς τὸ δοθὲν ὀκτάεδρον κύβον ἐγγράψαι.

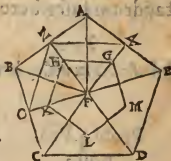


Ploblema 4. Propositio 4.

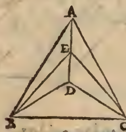
In dato octaëdro cubum inscribere.

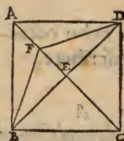
Εἰς τὸ δοθὲν εἰκοσάεδρον δωδεκάεδρον ἐγγράψαι.

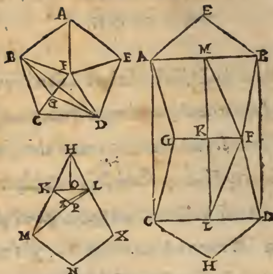
Proble. 5. Proposi. 5.



In dato Icosaëdro dωdecaëdrum inscribere.






A
B
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ΣΧΟ'ΛΙΟΝ.

Δεῖ εἰδέναι ἡμᾶς, ὅτι ἐάν τις ἐρεῖ ἡμῖν πόσας πλευρὰς ἔχει τὸ εἰκοσάεδρον, φήσομεν οὕτως. φανερὸν ὅτι ὑπὸ εἴκοσι τριγώνων περιέχεται τὸ εἰκοσάεδρον, καὶ ὅτι ἕκαστον τρίγωνον ὑπὸ τριῶν εὐθειῶν περιέχεται. δεῖ οὖν ἡμᾶς πολλαπλασιάσαι τὰ εἴκοσι τρίγωνα ἐπὶ τὰς πλευρὰς τοῦ τριγώνου, γίνεται δὲ ἑξήκοντα, ὧν ἥμισυ γίνεται τριάκοντα. ὁμοίως δὲ καὶ ἐπὶ δωδεκαέδρου. πάλιν ἐπειδὴ δώδεκα πεντάγωνα περιέχουσι τὸ δωδεκάεδρον, πάλιν δὲ ἕκαστον πεντάγωνον ἔχει πέντε εὐθείας, ποιοῦμεν δωδεκάκις πέντε, γίνεται ἑξήκοντα. πάλιν τὸ ἥμισυ γίνεται τριάκοντα. διὰ τί δὲ τὸ ἥμισυ ποιοῦμεν; ἐπειδὴ ἑκάστη πλευρά, κἄντε ᾖ τριγώνου, ἢ πενταγώνου, ἢ τετραγώνου, ὡς ἐπὶ κύβου, ἐκ δευτέρου λαμβάνεται. ὁμοίως δὲ τῇ αὐτῇ μεθόδῳ καὶ ἐπὶ κύβου, καὶ ἐπὶ τῆς πυραμίδος, καὶ τοῦ ὀκταέδρου τὰ αὐτὰ ποιήσας εὑρήσεις τὰς πλευράς. εἰ δὲ βουληθείης πάλιν ἑκάστου τῶν πέντε σχημάτων εὑρεῖν τὰς γωνίας, πά

λιν τὰ αὐτὰ ποιήσας, μέριζε παρὰ τὰ ἐπίπεδα τὰ περιέχοντα μίαν γωνίαν τοῦ στερεοῦ, οἷον ἐπειδὴ τὴν τοῦ εἰκοσαέδρου γωνίαν περιέχουσι ε̄ τρίγωνα, μέριζε παρὰ τὰ ε̄, γίνονται δώδεκα γωνίαι τοῦ εἰκοσαέδρου. ἐπὶ δὲ τοῦ δωδεκαέδρου, τρία πεντάγωνα περιέχουσι τὴν γωνίαν, μέρισον παρὰ τὰ τρία, καὶ ἕξεις κ̄ γωνίας οὔσας τοῦ δωδεκαέδρου. ὁμοίως δὲ καὶ ἐπὶ τῶν λοιπῶν εὑρήσεις τὰς γωνίας.

Τέλος Εὐκλείδου στοιχείων.

SCHOLIVM.

Meminisse decet, si quis nos roget quot Icosaedrum habeat latera, ita respondendum esse. Patet Icosaedrum viginti contineri triangulis, quodlibet verò triangulum rectis tribus cōstare lineis. Quare multiplicanda sunt nobis viginti triangula in trianguli vnius latera, fiuntque sexaginta, quorum dimidium est triginta. Ad eundem modum & in dodecaedro. Cùm enim rursus duodecim pentagona dodecaedrum comprehendant, itemque pentagonum quoduis rectis

quinque cōstet lineis, quinque duodecies multiplicamus, fiunt sexaginta, quorū rursus dimidium est triginta. Sed cur dimidiū capimus? Quoniam vnumquodque latus siue sit trianguli siue pentagωni, siue quadrati, vt in Cubo, iteratò sumitur. Similiter autem eadem via & in cubo & in pyramide & in octaëdro latera inuenies. Quòd si item velis singularum quoque figurarum angulos reperire, facta eadem multiplicatione numerum procreatum partire in numerum planorum quæ vnum solidum angulum includunt: vt quonian triangula quinque vnum Icosaedri angulum continent, partire 60. in quinque, nascuntur duodecim anguli Icosaëdri. In dωdecaëdro autem tria pentagωna angulum comprehēdunt. partire ergo 60. in tria, & habebis dωdecaëdri angulos viginti. Atque simili ratione in reliquis figuris angulos reperies.

Finis Elementorum Euclidis.



NON POTVIT FIERI, CANDIDE Lector, quin errores aliquot recenti huic editioni obrepserint propter varias in exemplari scripto lituras, quibus pleraque nobis immutanda fuerunt. Hos ergo strictim notatos amicè & beneuolè corrigito.

Libro 1. in definitio. ε. lege ἐπιφάνεια. *8. iacētiū.* θ. ὅταν. ιη. περιφερείας. λγ. πλευράς. *33. inter se aequalia. 35. parallelae rectae. In postula.* β. πεπερασμένην. *2. continuum. In propositio.* δ. ὑφ' ἃς αἱ. ζ. ἐπὶ τὰ. *8. aequalibus.* κϛ. δυσὶ γωνίαις. λθ. μέρη, καὶ. μδ. παραβαλεῖν. *47. continentibns describuntur, quadratis. Libro 2. in definit.* β. χωρίου, τῶν περὶ τὴν διάμετρον αὐτοῦ ἕν. *propo. 5.* εὐθεῖα ἐπ' εὐθείας. ὀρθογώνιον. *6. & adiecta, simul cum quadrato à. Lib. 3. propo.* γ. δίχα τέμνῃ, καὶ πρὸς ὀρθὰς αὐτὴν τεμεῖ. καὶ ἐὰν πρὸς ὀρθὰς. *8. rectarum.* ιϛ. μεταξὺ τόπον τῆς τε εὐθείας καὶ τῆς περιφερείας ἑτέρα εὐθεῖα. *Lib. 5. defini.* ιε. λῆψις. *15.* ῆ. *prop. 4.* τοσαυταπλάσια ἔσται. *2. tertia cū sexta, quartae. 21. ipsis aequales. Lib. 6. prop. 5. sub quibus homologa.* ιϛ. ἴσον ἐστὶ τῷ ὑπὸ τῶν μέσων περιεχομένῳ ὀρθογωνίῳ. ἐπεί. *Lib. 7. definit.* ιζ. πλευραὶ δὲ αὐτοῦ. *propo.* κα. τῶν τὸν αὐτὸν λόγον. κθ. ποιῇ τινά, οἱ. *Lib. 9. propo.* ιβ. ὑφ' ὅσων ἂν ὁ. λ. ἥμισυ αὐτοῦ. *Lib. 11. propo.* δ. δυσὶ εὐθείαις. λε. μετεώρων ληφθῇ. *Lib. 13. fol. 119. b. vers. 7.* ἐξ τέτταρσιν. *In quibusdam accentuum & distinctionum notulis quicquid peccatum fuerit, id facilè vel tacentibus nobis animaduerti potest.*


IN PINGVI GALLINA

